A. P. I. Mid-Year Meeting

The OIL AND GAS JOURNAL

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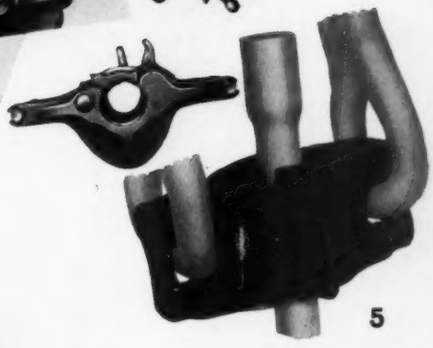

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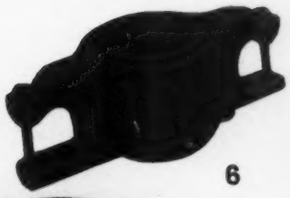

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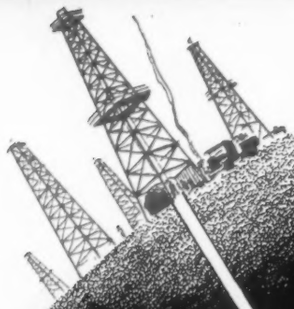

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HOWCO DEEP WELL FACILITIES *Include:*

1—CEMENTING EQUIPMENT—The fastest known method of mixing cement.

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THE OIL AND GAS JOURNAL

Volume 33
Number 52

May 16, 1935

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OIL MAN'S CALENDAR

May

16-17—Roanoke, Va., Virginia Oil Men's Association and Virginia Oil Jobbers Association, annual meeting, Patrick Henry Hotel.

20-23—New York, Annual Convention, National Association of Purchasing Agents, Waldorf-Astoria Hotel.

June

5-6—Pittsburgh, Pa., Eastern district, A.P.I. Division of Production.

6—Los Angeles, Calif., California Natural Gasoline Association.

7-8—Tulsa, Mid-Continent Group, North American Gasoline Tax Conference, Alvin Hotel.

10-11—Fargo, N. Dak., Northwestern Petroleum Association, North Dakota Division.

19-21—Cincinnati, Ohio, American Society of Chemical Engineers.

20-21—State College, Pa., Pennsylvania Grade Crude Oil Association, annual meeting.

24-28—Detroit, Mich., American Society for Testing Materials, annual meeting, Book Cadillac Hotel.

August

(?)—American Petroleum Equipment Suppliers' Association, place to be named later.

19-24—San Francisco, Calif., American Chemical Society.

September

12-13—Louisville, Ky., Kentucky Petroleum Marketers Association.

18-20—Hot Springs, Ark., North American Gasoline Tax Conference.

18-20—Atlantic City, N. J., National Petroleum Association, annual meeting, Hotel Traymore.

October

14-18—Louisville, Ky., National Safety Council, Twenty-fourth Annual Safety Congress.

14-18—Atlantic City, N. J., American Gas Association, Manufacturers Division.

November

4-5—Dallas, Tex., I.P.A.A., annual convention.

11-14—Los Angeles, Calif., American Petroleum Institute, sixteenth annual meeting, Biltmore Hotel.

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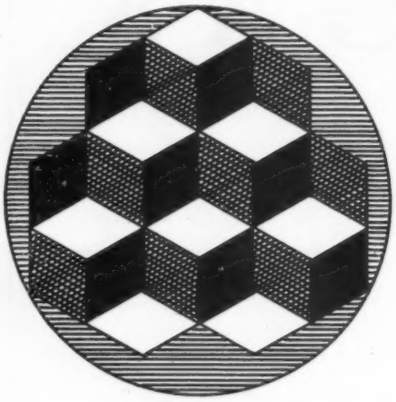
Speaking of optical illusions . . .



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Increasing Consumption and More Constructive Legislative Attitude Augur Better Times

By ANDREW M. ROWLEY

CONDITIONS in the petroleum industry appear brighter now than they have for a long time with the basic situation sound and every indication that continued improvement will be experienced as long as the industry can maintain the present balance between supply and consumer demand. Latest figures available on domestic consumption show the previous high record established last year is being exceeded. It is believed another all time record for domestic requirements of gasoline will be made this year if present consumption and conditions are any criterion.

The greatest deterrent to recovery in the oil business has been the uncertainty regarding legislation, both state and Federal. The statement has been made frequently the petroleum industry now would be well entered in one of the greatest business revivals in its history were oil men assured they could go ahead with plans, long formulated and approved, without fear of having basic conditions affecting labor, material and taxes changed on them after new operations were started.

Legislators and members of Congress are beginning to realize this fact and there is a strong tendency apparent now to let business conduct its own affairs. This is regarded as one of the most favorable factors and signs in the present situation. Just as soon as the petroleum industry is relieved of the uncertainty of pending legislation, it is believed the oil business will experience an immediate and very material improvement.

With gasoline consumption registering a steady gain, field operations are becoming still more active but results, for the most part, serve only to emphasize more strongly the necessity of still further increases in drilling activity to provide necessary reserves. The situation in East Texas is regarded as being especially good at this time, additional legislation enacted in Texas strengthening enforcement, with the result overproduction has been reduced to a minimum.

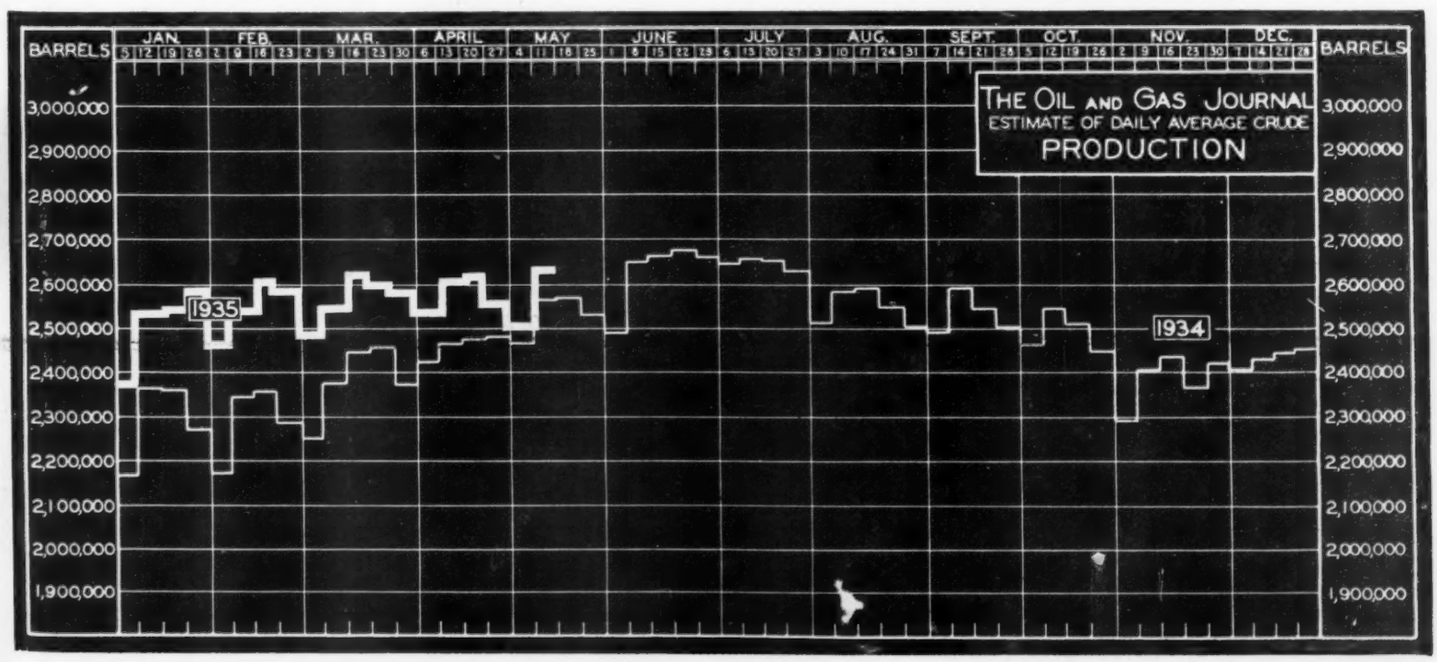
A new high gravity oil field was opened in Wyoming by the Ohio Oil Company and the California Company in a test drilled on the Medicine Bow Structure in Carbon County. The well flowed 795 barrels in five hours, making 165 barrels the last hour and the crude tested 63 gravity. Another new pool was opened in Kansas, where the bringing in of new pools has become somewhat of a weekly habit. The latest is in Rice County where the discovery well made 600 barrels. Leasing activity in Kansas and Oklahoma continue at a high level.

Crude Oil Production in the United States

Estimated daily average production for the week ending May 11, a comparison with previous week and the Federal allowables follow:

		Federal allowable	
	May 11	May	May 4
Oklahoma—			
Oklahoma City	175,180	.....	116,150
Seminole-St. Louis	98,200	.....	91,125
Remainder of State	249,475	.....	251,300
Total Oklahoma	522,825	500,200	458,575
East Texas—			
Lathrop	161,530	.....	160,723
Kilgore	153,710	.....	152,420
Joiner	152,837	.....	153,810
Total East Texas	468,077	.....	466,953
West Texas	151,157	.....	151,210
North Central Texas	83,354	.....	82,155
Texas Panhandle	62,153	.....	55,120
East Central Texas	48,456	.....	48,210
Gulf Coast—Texas	178,273	.....	179,910
Southwest Texas	63,159	.....	62,273
Total State of Texas	1,054,629	1,032,900	1,045,831
Kansas	145,850	148,400	144,725
North Louisiana	23,055	.....	23,365
Gulf Coast—Louisiana	105,150	.....	105,653
Total Louisiana	128,205	112,200	129,018
Arkansas	31,295	30,300	31,510
Eastern Fields (except Michigan)	106,500	106,200	106,500
Michigan	39,908	34,300	40,019
Rocky Mountain area	99,150	102,500	100,960
California—			
Santa Fe Springs	38,750	.....	36,000
Long Beach	70,500	.....	58,500
Mountain View	11,900	.....	10,250
Elwood	10,300	.....	10,150
Kettleman Hills	55,000	.....	41,000
Remainder of State	329,700	.....	296,600
Total California	516,150	494,200	452,500
Total United States	2,644,512	2,561,200	2,509,638

Increase 134,874 Bbls. Daily.



The Bulletin Board

The Proposed New N. I. R. A., generally known as the Harrison Bill, which would enlarge very greatly government control over the petroleum industry, is not conceded much chance of passage by the present Congress, it being felt the Clark bill for extension of the present law, with modifications, until April 1, 1936 stands a better chance of passage.

•

A Record Demand for gasoline in the United States this year is indicated by figures available for the first quarter and estimates on present consumption. The first quarter recorded a gain in domestic consumption over the same period of last year and last year established an all time high record.

•

Alcohol Blends featured discussion at a meeting in Dearborn, Mich., of a number of farm bureaus and the American Chemical Foundation. Dr. George Granger Brown expressed opposition to the proposal to force the use of a motor fuel of gasoline blended with alcohol but the conference did not take action on a proposition submitted by the American Petroleum Institute for an impartial investigation of the merits and economics of alcohol blended gasoline.

•

East Texas Overproduction has been reduced to a minimum and operations of refineries in that area show a considerable curtailment, only 24 plants running last week and processing only 37,210 barrels daily, a drop of 11,000 barrels daily from the previous week.

•

Drill Stem problems are many and varied with failures due to numerous causes, many of which are discussed with suggestion to weight and speed.

•

Confiscation of oil or gas produced in violation of laws of the state or valid rules or regulations of state authorities is provided for in a law signed by Gov. James V. Allred of Texas.

•

Natural Gasoline Production in the Texas Panhandle will be reduced approximately 400,000 gallons daily, or 50 per cent of the present output there, when the natural gas conservation law recently enacted in Texas is made effective. Such curtailment is expected to have a material effect upon the natural gasoline market.

•

Motor Fuel Blending material claimed to be more effective than pure iso-octane for suppressing motor knocking is being prepared commercially in a refinery and the process, known as gas polymerization, is being discussed by refiners attending the Mid-Year meeting of the American Petroleum Institute in Tulsa.

The Thomas Bill may be called up on the floor of the Senate at an early date although its passage by the Senate does not seem to be as bright as it did two weeks ago.

•

Pipe Line Protection advanced another step when The Texas Company made practical the application of cathodic protection to lines not accessible to electric power lines by installing along the line a wind driven generator unit.

•

The Amount of Free Pipe in a hole where the string has become frozen or cemented can be determined by following two methods which have been worked out and used with success in practice.

•

Code Revision is occupying the attention of oil industry representatives at Washington. Amendments have been submitted to the Planning and Coordination Committee by the production and refining sub-committees.

•

Solvent Refined Lubricants formed the topic of papers and discussions at the Mid-Year meeting of the Institute, a marked improvement in the technical developments of the various processes within the past year being shown and statements made that lubricants manufactured by such methods were superior to those manufactured by conventional means.

•

Three New Refineries are to be constructed in Central Michigan according to tentative plans for the plants announced this week.

•

Production Problems require for their solution in many instances a knowledge of both the physical transformations and energy changes occurring with changing temperatures and pressures, and great improvement has been made in the technique of securing and examining sub-surface samples of oil and gas.

•

A 30,000-Barrel combination cracking and topping unit will be under construction at the Beaumont, Texas plant of the Magnolia Petroleum Co. within the next week. This represents the largest item of refinery construction for distillation equipment at this time in the United States.

•

Thirty-five Hydrocarbons have been identified and isolated in an ordinary Mid-Continent gasoline and some 20 more are now under investigation as part of a program of fundamental research being conducted by the A. P. I.

The Amateur Hour

—Drawn Exclusively for The Oil and Gas Journal.

Oil Industry Is Busy On Revision of Code For Nine Months More

By HUGH D. MALLON
Washington Bureau, The Oil and Gas Journal

WASHINGTON, D. C., May 13.—With action on the extension of the NRA about to come up in the Senate the oil industry is busy preparing amendments and revisions for the petroleum code, it now being almost certain the industry will continue under such a code for at least nine more months.

Opinion now seems to be that although the Harrison bill extending NRA two years is dead, that S. J. Res. 113, introduced by Senator Clark of Missouri to extend the act to April 1, 1936, will be considered and passed by the Senate. There is a strong movement in the Senate to defer consideration of this legislation until the Supreme Court rules in the Schechter case on which it is expected to act on May 27th.

The Clark Resolution

S. J. Res. 113 is as follows:

JOINT RESOLUTION

To extend until April 1, 1936, the provisions of Title I of the National Industrial Recovery Act, and for other purposes.

Resolved, by the Senate and House of Representatives of the United States of America in Congress assembled, that section 2(c) of Title I of the National Industrial Recovery Act is amended by striking out "at the expiration of two years after the date of enactment of this Act" and inserting in lieu thereof "on April 1, 1936."

Sec. 2(a) In the application of Title I of such Act after the date of enactment of this joint resolution and until April 1, 1936, the following amendatory provisions shall apply:

(1) No price fixing shall be permitted or sanctioned under the provisions of any code; except that provisions for the regulation of prices under governmental control may be included in codes for those mineral natural-resource industries in which prices are now fixed pursuant to the provisions of any code and which the President finds to be so affected with a public interest that such regulation is necessary and proper in the public interest.

(2) No code of fair competition shall be applicable to any person whose business is wholly intrastate.

Sec. 3. The President shall review or cause to be reviewed for compliance with the requirements of this joint resolution every code in effect on the date this joint resolution takes effect. In order to afford reasonable opportunity for such review, such codes are hereby continued in effect (subject to cancellation or modification pursuant to the provisions of this joint resolution) for a period of 30 days after June 15, 1935, unless previously reviewed and superseded; but no such code shall continue in effect after the expiration of such 30-day period unless the President has reviewed such code and has approved it and finds that the code in the form so approved conforms to the requirements of this joint resolution.

Senator Robinson of Arkansas has announced that as a result of a caucus of the Democratic senators the Senate will consider the Clark resolution in place of the Harrison proposal.

Effect of Amendments

The Clark amendments, which the majority of the Senate has agreed shall pass provide that "No price fixing shall be permitted or sanctioned under the provisions of any code; except that provisions for the regulation of prices under governmental control may be included in codes for those mineral natural-resource industries in which prices are now fixed.

The price fixing provision, some attorneys think, will eliminate the petroleum industry from price fixing, due to the fact that, although the petroleum code does provide for price fixing these powers have never been used. The amendment says "those mineral natural-resource industries in which prices are now fixed pursuant to the provisions of any code."

The amendment that "No code of fair competition shall be applicable to any person whose business is wholly intrastate," in the opinion of several attorneys, and members of the industry, will eliminate practically all small units in not only the oil industry, but in every other industry.

Retail filling stations, if the operator operates in only one state, would not be covered by the code, while producers, if they did not transport the oil into another state, would not be liable for any of the code provisions. This would be true of refiners operating in only one state.

The effect on rig-building and derrick operations would be to nullify all code provisions pertinent to their operations, and this would be true of drilling crews. Thus the only units left subject to regulation would be the major integrated companies operating in more than one state.

House May Balk

Although the Senate has announced intention of passing this resolution, and President Roosevelt has signified his willingness to accept it if the two-year extension cannot be obtained, the House is expected to refuse the Clark proposal and to hold out for a two-year extension. The ensuing snarl may cause the present act to expire before the adoption of new legislation, although an agreement will probably be reached before the act expires on June 16. Even the most ardent supporters, however, do not believe anything will be settled until almost the 16th of June.

Amending the Code

In anticipation of this change in the Recovery Act the Planning and Coordination Committee is revising the Petroleum code. Revisions have been submitted to the committee by the Production and the Refining Sub-committees. The Labor Sub-committee has gone over the labor provisions to make them more workable, enforceable and comprehensive, as well as legal.

In the new code there is a possibility the provisions concerning equitable differentials between the minimum wages for common labor and wages to be paid for skilled labor may be eliminated. President Roosevelt is understood to be averse to such provisions in codes, being of the opinion that they lead only to controversy between employer and employe, and serve no constructive purpose.

This contention of the President is particularly true of the petroleum code, a provision of this nature being included in the original code, an interpretation of which by the Petroleum Labor Policy Board was of such an ambiguous nature it was never clearly understood by either labor or industry and led to endless controversy and strained feeling.

While the Marketing Sub-committee has not, as a committee, considered a revised marketing section, individual members have given the matter much thought. The majority of the sub-committee thinks nothing concrete can be done until it is known exactly what will be provided in the law for them to operate under. However, the committee is near enough in accord to work out any differences, and will be able to work out a comprehensive draft within a few hours. It is the consensus that the provisions included should not attempt to cover too much territory and should be confined to provisions agreed to by almost the entire affected industry.

Many members of the committee believe only a few rules and regulations should be laid down in the code, leaving other controversial matters, as well as matters which do not affect the industry in all parts of the country, to be worked out by agreement within the industry, with the approval of the Administrator. It has been said agreements patterned after the Pacific Coast Marketing Agreement might be worked out for different sections, attempts being made under such agreements to work out local differences affecting marketing practices in the immediate area. Such agreements on a national scale, it is claimed, would not be workable, but for different areas, with different problems, they are said to be the logical solution.

Thomas Bill Losing

The Thomas oil control bill is expected to be called up on the floor of the Senate at an early date, although its passage by the Senate does not seem to be as bright as it was two weeks ago.

Administrator's Report on Crude Oil Stocks

WASHINGTON, D. C., May 13.—Stocks of domestic and foreign crude petroleum at the close of the week ended May 4 totaled 326,398,000 bbls., representing an increase of 1,184,000 bbls., divided as between increases of 1,136,000 and 48,000 bbls. in stocks of domestic and foreign crude petroleum, respectively.

Current reports of the industry for the week ended May 4, in comparison with those for the previous week, show a material decline in crude runs to stills and a smaller, though substantial, decrease in production. The approximate daily average production for the week ended May 4 was 2,530,000 bbls., or 70,000 bbls. below the average of the previous week. Daily average imports increased from 72,000 to 98,000 bbls. Daily average crude runs to stills amounted to 2,415,000 bbls., or 165,000 bbls. below the average for the previous week.

STOCKS OF CRUDE PETROLEUM, APRIL 27 AND MAY 4, 1935

Grade of crude oil—	Apr. 27	May 4
Pennsylvania Grade	4,664,000	4,709,000
Other Appalachian	936,000	971,000
Lima-N.E. Indiana-Michigan	1,239,000	1,355,000
Illinois-S.W. Indiana	11,594,000	11,639,000
N. Louisiana and Arkansas	10,162,000	10,062,000
West Texas and S.E. New Mexico	31,477,000	32,022,000
East Texas	31,348,000	31,373,000
Other Mid-Continent	148,457,000	148,697,000
Gulf Coast	21,013,000	21,615,000
Rocky Mountain	27,661,000	27,651,000
California	*32,995,000	32,548,000
Domestic crude	*321,506,000	322,642,000
Foreign crude	3,708,000	3,756,000
Total†	*325,214,000	326,398,000

*Revised. †Represents approximately 98 per cent of total stocks in the United States.

Important Technical Papers Read at A. P. I. Mid-Year Meeting, Tulsa

AXTELL J. BYLES
President

By L. G. E. BIGNELL
Petroleum Engineering Editor

Preconvention activities assumed large proportions during the three days preceeding the actual beginning of the fifth mid-year meeting of the American Petroleum Institute in Tulsa. The technical sessions started Wednesday morning, May 15, but some meetings were held on Sunday, May 12, and a large number on Monday and Tuesday.

These meetings were well attended and business was handled with dispatch and many points cleared up and the committeemen assigned other duties to perform between now and the annual meeting in November when final reports are to be made. These committee meetings were attended by men from all parts of the country and there were more than 200 registered before the meeting formally opened Wednesday. It is anticipated more than 1,200 will register for the meetings, and all hotels in Tulsa report capacity reservations for this week.

On Sunday, May 12, the Topical Committee on Vocational Training met under the leadership of Walter H. Meier, Atlantic Oil Producing Co., Dallas, Tex., chairman, and H. N. Blakeslee, also of Dallas, as secretary. This committee has been instrumental in forming vocational schools in more than 174 cities and towns in Texas and Oklahoma with a total registration of more than 5,000 oil field workers. There are over 200 instructors engaged to carry on this work and reports received from the various districts indicate increase in attendance.

The committee plans to extend this work to include the oil fields of California, Kansas and other oil states, and in California organization work has proceeded far enough to indicate many vocational schools will be formed in the near future. Kansas oil conservation officials and executives of oil companies have indicated interest and it is believed problems that have confronted organizers in that State will be overcome in the near future, followed by the establishment of many vocational schools there.

Leaders of the industry active in engineering and manufacturing circles are playing an important part on all committees and their discussions of standardization problems are doing much to solve them and improve material and equipment used in all branches.

The technical session of the production division which started Wednesday morning included a paper by H. W. Fletcher, of the Hughes Tool Co., Houston, Tex., on "Drill Stem," and another by H. W. Graham, of Jones & Laughlin Steel Corp., Pittsburgh, Pa., on "The Development of Rotary Drill Pipe." These papers dealt with the problems that confront the driller of rotary wells and outline progress made to date.

On Wednesday afternoon this division had its second session presided over by T. V. Moore, of the Humble Oil & Refining Co., and Allen D. Garrison, Rice Institute, Houston, Tex., presented a paper on "Selective Wetting of Reservoir Rock and Its Relation to Oil Production." In this paper Mr. Garrison reviewed the literature on effect of interfacial forces on the distribution of oil and water in porous material. Conclusions are drawn showing that oil and water cannot separate completely into layers in the reservoir, but must set up a definite equilibrium in which water fills all the pores having sizes below a certain magnitude. This conception of water as a network of capillaries in equilibrium with the oil throughout the reservoir is contrasted with that of definite levels of oil-water contact connoted in the terms, "edge water," "coning," or "nosing" of water.

The other papers presented Wednesday were by Ralph J. Schilthuis, Humble Oil & Refining Co., Houston, Tex., on "Technique of Securing and Examining Subsurface Samples of Oil and Gas," and a review by D. G. Hawthorne, Amerada Petroleum Corp., Tulsa, of "Subsurface Pressure Instruments."

The closing session of the production division was held Thursday morning and D. R. Knowlton, Phillips Petroleum Co., Bartlesville, Okla., presided. R. E. Watson, Humble Oil & Refining Co., Houston, Tex., presented his paper on "Cementing Methods for Excluding Water from Producing Wells," followed by "Electrical Exploration of Drill Holes," by Alexander Deussen, consulting geologist, and E. G. Leonardon, of Schlumberger Well Survey Corp. of Texas, Houston, Tex.

J. T. Hayward, Barnsdall Oil Co., Tulsa, presented the final paper on the program describing "Methods for Determining How Much of a Frozen or Cemented Column of Pipe Is Free."

Gas Polymerization and Solvents Refining Topics

By W. T. ZIEGENHAIN

The commercial scale manufacture of a motor fuel blending material more effective than iso-octane in raising the antiknock value of gasoline and the service record of solvent refined lubricants proved to be items of greatest interest among the refiners attending the mid-year meeting of the A.P.I. in Tulsa this week. Particular attention was paid to solvent refining and a symposium on the subject included papers by many authorities who discussed the characteristics of oils made by selective solvent refining both from the standpoint of laboratory test comparisons and actual road service records.

A paper by G. R. Bryant of the Indian Refining Co. and R. E. Manley and B. Y. McCarty of the Texas Co. described the commercial processing through a furfural unit of distillate stocks derived from Mid-Continent crudes ranging in viscosity between 40 and 180 seconds at 210° F. Solvent losses as low as .038 per cent of the total solvent distilled have been found practical to expect and the direct operating cost is claimed to be less than 18 cents per barrel of charge. Investment costs of $70 per barrel of daily capacity for a 5,000-bbl. unit have been realized and the total cost of a 500-bbl. per day unit has been held to $150,000.

Malcolm H. Tuttle of the Max B. Miller Co. stressed the flexibility of the Duo-Sol process in discussing the various means for solvent refining and pointed out that by use of the countercurrent flow of propane and the naphthenic solvent used, any stock, regardless of source, could be processed to manufacture lubricants of highest stability and viscosity index.

Emphasizing the possibility of a wide choice of charging stock when using the Chlorex process and claiming exceptionally favorable results when blending solvent refined bright stocks with ordinary neutrals, D. B. Williams of the Carbide & Carbon Chemicals Corp. presented laboratory data to show the merits of oils thus processed.

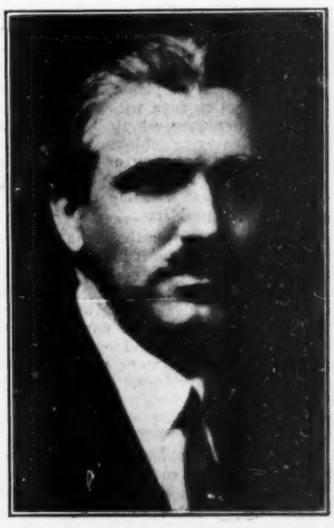
Recognizing the need for a suitable laboratory procedure for studying the adaptability of various crude to solvent refining, and appreciative of the variety

(Continued on Page 35)

W. R. BOYD, JR.
Executive Vice President

GEORGE A. HILL, JR.
Vice President, Production

W. G. SKELLY
Vice President, Refining



C. E. ARNOTT
Vice President, Marketing

Discuss Power Problems at Meeting of Oil and Gas Division, A.S.M.E.

By L. G. E. BIGNELL
Petroleum Engineering Editor

The Oil and Gas Power Division of the American Society of Mechanical Engineers met with the Mid-Continent section of the society in Tulsa May 8 to 11, inclusive. This meeting was arranged to give eastern and Mid-Continent members interested in power problems an opportunity to discuss different phases of this general proposition. The eastern group was made up mostly of manufacturers and designing engineers, as well as engineers and chemists for manufacturers of fuels and lubricants for internal combustion engines. The western group was made up of users of this type of power.

The opening session held on Wednesday, May 8, listened to two papers. The first was presented by J. B. Harshman, engineer, Stanolind Pipe Line Co., entitled "Experiences with High Speed Diesel Engines in Pipe Line Service," and was published in full in The Oil and Gas Journal of May 9. The second paper was prepared by W. F. Joachim, of the Atlantic Refining Co., Philadelphia, Pa., and discussed "Characteristics of Diesel Fuel Oil."

Practical to Use Crude Oil

Mr. Harshman in his paper presented conditions and results found in pipe line stations handling crude oil from the fields to terminals. Many of these oils used for engine fuel contain sulphur compounds. It is much more practical to use crude oil direct from the pipe lines leading into the stations than to haul to those stations special Diesel fuels secured at some distance from consumption points.

From the discussions following Mr. Harshman's presentation of his paper it was apparent that manufacturers of high speed Diesels had assumed that Diesel fuel oils were readily obtainable at these pipe line stations. While it is admitted that it is possible to procure special grades of Diesel fuel for these engines it is not economical when there is an abundance of crude oil flowing through the stations at all times when in operation.

The manufacturers were inclined to make recommendations for the use of special material in pistons, piston rings and cylinders to cope with the corrosion problems that were set up by the use of crude oil carrying sulphur compounds. It developed that many of these special metals have been tried with varying success, but without securing the complete answer to the problems.

As the engineers for the manufacturers discussed this problem it became apparent that there are basic problems that must be considered if the high-speed Diesel engines are to give satisfactory service for pipe line stations, and now that they have a clearer picture of operating conditions the opinions were advanced that solution of the problems will be forthcoming.

Central Power Plants

The morning session held on Thursday, May 9, listened to two papers. The first by J. A. Niles, engineer, Stanolind Oil & Gas Co., entitled "Portable Rotary Units," was published on page 43 of The Oil and Gas Journal of May 9. The second paper was by Austin Allen of the Phillips Petroleum Co., Bartlesville, Okla., and dealt with "Central Power Plants Transmitting Power Mechanically to Wells."

The use of portable rotary and cable tools units is expanding rapidly and they are generally powered with internal combustion engines. It is this phase of the problem that was of special interest to the engineers designing engines and many questions were asked of Mr. Niles after he had presented his paper.

Central powers are not new in the oil fields for pumping comparatively shallow wells, but the use of internal combustion units for power is a development of recent years. The discussion following the presentation of the paper indicated that the eastern visitors were gathering information for future use in connection with their design of units suitable for this duty.

On Thursday afternoon a group of 32 visitors and local engineers made a trip by automobile to the Hominy pipe line station of the Stanolind Pipe Line Co., where several different type Diesel engines are in operation furnishing power to the pumps handling the oil in this trunk pipe line under high pressure.

From Hominy the party drove to the Polo Pool, near Perry, Okla., where wells are being drilled with rotary outfits that are powered with Diesel engines generating direct current conducted to the direct current motors driving drawworks and pumps.

Individual Well Units

Prof. H. W. Carson, University of Oklahoma, Norman, Okla., presided at the Friday morning session. The first speaker was Paul D. Cornelius, Tulsa, Okla., and his subject was "Central Power Plants Transmitting Power Pneumatically to Wells." This paper was published in The Oil and Gas Journal of May 9.

Glenver McConnell, chief mechanical engineer, Shell Petroleum Corp., Tulsa, was the next speaker and presented the paper published in The Oil and Gas Journal last week entitled "Diesel and Gas Individual Well Pumping Units." Both of these papers were discussed at some length and it was noted that the eastern visitors in particular asked many of the questions.

H. J. Vander Eb of the Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn., closed the morning session with a discussion on "Insurance of Diesel Engines," pointing out conditions observed in many plants that might be improved and thereby lower the insurance rate.

During the Friday afternoon session, Ralph Miller, engineer for Ingersoll-Rand Co., New York City, presided and introduced as first speaker Carl Belm, of the United American Bosch Co., Springfield, Mass., who presented his paper on "Experiences with Fuel-Injection Equipment in Oil Field Service." This paper was followed by one prepared by Carl Bjornsson of the engineering department of Clark Brothers, Olean, N. Y., and read by Harte Cooke, chief engineer for McIntosh & Seymour Co., Auburn, N. Y. The paper was entitled "Compressed Air Transmission with Diesel Locomotives." These papers were of particular interest to the designing engineers and manufacturers of internal combustion engines, although they contained many points of interest to the petroleum engineers and there were many of them present who followed the presentation closely.

General Symposium

For the closing session on the program, Hollis P. Porter, chairman of the Mid-Continent section, A.S.M.E., Tulsa, Okla., presided. The discussion was devoted to problems encountered in compressed air systems, corrosion of bearings and crankshafts and allied subjects. It was instructive and many interesting points were discussed by both manufacturers and users of this type of equipment.

All of the meetings were well attended and more than 150 members and guests registered. There was a very interesting display of accessories for engines and engine plants arranged in the corridor leading to the assembly hall. Many of these pieces of equipment were for cleaning air either before it entered the combustion chambers in the engine or before it entered the operating rooms. Centrifuges for cleaning lubricating oils, piston rings, packing, oiling systems and other similar items made up this very interesting exhibit which proved profitable both to the manufacturers and customers.

Many members of the Petroleum Electrict Power Club were also in attendance at these meetings and on Monday a group of about 25 men interested in the manufacture and sale of electricity from central power plants had an informal luncheon in Tulsa. Many of those present were from the eastern seaboard and other distant points.

Bureau of Mines Report on Petroleum and Petroleum Products for March

Crude Petroleum: Crude oil production in March, 1935, totaled 81,488,000 bbls., a daily average of 2,628,600 bbls. The daily average for March, 1935, was the highest since the middle of 1934, being an increase of about 30,000 bbls. over the average in February, 1935, and higher than the average of a year ago by nearly 200,000 bbls.

The increase of 30,000 bbls. in daily average production in March, 1935, was divided among several states, with Oklahoma having about half, Texas about 5,000 bbls., Kansas about 6,000 bbls., with the rest scattered. Daily average production in California remained virtually unchanged at just below the 500,000-bbl. mark. Production in Oklahoma passed the 500,000-bbl. mark for the first month since July, 1934. Production in East Texas showed little change, the average for March being 494,200 bbls., compared with 493,100 bbls. in February. Drilling in East Texas showed no indications of falling off; in fact, in the number of oil wells brought in, total initial, and wells drilling end of month, March exceeded February. The steady increase in production in Louisiana was continued. The daily average for Kansas was 155,500 bbls., the highest recorded for any month in recent years and probably the record for all time.

Crude runs to stills declined materially in March which, in conjunction with the increase in crude oil production, resulted in a material increase in stocks. This gain in stocks was about 1,800,000 bbls., which brought the total to 339,139,000 bbls. on March 31.

Refined Products: The decline in crude runs to stills was partially offset by a gain of .2 per cent in average gasoline yield, but daily average motor fuel production declined from 1,199,000 bbls. in February to 1,178,000 bbls. in March. The indicated domestic demand for motor fuel in March was 31,997,000 bbls., a daily average of 1,032,000 bbls.; compared with a year ago, these data indicate an increased demand of 4.8 per cent. Exports of motor fuel increased materially, the daily average for March being 84,000 bbls., compared with the revised daily average of 45,000 bbls. for February. Stocks of gasoline reflected the curtailment in refinery operations, with the result that the net increase in March was less than expected. The total on hand March 31, 1935, was 66,290,000 bbls., comprising 60,405,000 bbls. of finished gasoline, 5,885,000 bbls. of unfinished gasoline, but no natural gasoline.

The seasonal decline in fuel oil consumption was clearly reflected in the data for the indicated demand for kerosene, gas oil and fuel oil, and petroleum coke. However, stocks of most of these fuels continued to decline.

According to the Bureau of Labor Statistics, the price index for petroleum products for March, 1935, was 49.8, compared with 48.7 in both February, 1935, and March, 1934.

The refinery data of this report were compiled from refineries with an aggregate daily recorded crude oil capacity of 3,655,000 bbls. These refineries operated during March, 1935, at 68 per cent of their capacity, compared with a ratio of 72 per cent in February, 1935.

California Production District 1935 Officers

LOS ANGELES, Calif., May 11.—Bruce Barkis, of the Rio Grande Oil Co., Los Angeles, Calif., has been elected chairman of the California district of the Institute's Division of Production for 1935. Vice chairmen are: A. H. Bell, Continental Oil Co., Los Angeles, for the Los Angeles Basin; W. L. Bagby, Shell Oil Co., Ventura, for the Coastal district; and H. G. Barton, U. S. Geological Survey, Taft, for the San Joaquin Valley. W. G. Corey, Pacific Gear & Tool Works, Los Angeles, is treasurer, and D. S. Kilgour, California Oil and Gas Association, Los Angeles, secretary.

W. L. McLaine, of the General Petroleum Corp., Los Angeles, is chairman of the advisory committee for 1935. Members are: L. L. Aubert, Bankline Oil Co.; H. S. Sole, Jr., Texas Co.; R. D. Copley, Standard Oil Co. of California; W. H. Geis, Super Asphalt Products Co.; A. S. Hayes, Kettleman North Dome Association; M. A. Kline, Andrews and Andrews; Joseph Jensen, Associated Oil Co.; H. M. Macomber, Pacific Western Oil Co.; E. W. Masters, Shell Oil Co.; W. B. Pyron, Western Gulf Oil Co.; A. C. Rubel, Union Oil Co. of California; R. E. Stearns, Universal Consolidated Oil Co., and W. C. Whaley, Barnsdall Oil Co., all of Los Angeles; W. N. Lacey, California Institute of Technology, Pasadena; H. F. Owen, Ether D. Co., Maricopa; R. L. Patterson, U. S. Geological Survey, Taft; and H. S. Stark, Honolulu Oil Corp., Taft.

Discussion of Alcohol for Power Feature of Dearborn Conference

By SPECIAL CORRESPONDENT

DEARBORN, Mich., May 14.—"Power alcohol"—alcohol blended with gasoline as a motor fuel—supplied the feature of the joint conference of agriculture, industry and science held here this week.

The conference was sponsored by the American Farm Bureau Federation, the National Grange, the Chemical Foundation and the National Agricultural Conference, all organizations which have been active in sponsoring the plan for promoting alcohol as a motor fuel in the United States. The latter plan, although listed on the program as only a part of the projects to be considered, virtually stole the show in the amount of interest it attracted.

The stated purpose of the conference was to survey the variety of farm products which through organic chemistry can be transformed into raw materials usable in industry, and to develop a plan for the joint co-operation of agriculture, industry and science for promoting in orderly fashion an increasing use of American farm products in American industry.

Challenge for A.P.I.

Mid-way in the consideration of the May 8 session devoted to alcohol motor fuel came an interruption in the thread of alcohol blending advocacy in the shape of a sharp challenge from the American Petroleum Industries Committee. It came in the form of a communication to the conference, duplicating a letter sent earlier to Francis P. Garvan, one of the hosts of the conference and head of the Chemical Foundation, which long has been a proponent of so-called power alcohol.

The challenge, formulated by Axtell J. Byles, president of the American Petroleum Institute, was in the form of an offer of $15,000 for an impartial investigation of relative merits of alcohol gasoline blends and straight gasoline, provided the Chemical Foundation would duplicate this expenditure in a joint project. At latest report the offer had not been accepted.

The communication was presented by Dr. George Granger Brown, professor of chemical engineering, of the University of Michigan, at the end of his address on "Alcohol - Gasoline Blends as Motor Fuels."

As the conference came to a close, it became evident that alcohol gasoline was the principal specific solution proposed for the broad general goal of improving the market for farm products. This was in spite of the fact that the stated object was that the plan would (1) result in the gradual absorption of much of the domestic farm surplus by domestic industry; (2) put idle workers to work profitably; (3) increase the purchasing power of the American farmer on a stable and more permanent basis; (4) increase the demand for manufactured products which the American farmer wants, needs and thus will be able to purchase; and (5) create new work for idle hands to do, thus reviving American industry and aiding American labor.

"It is believed," stated the conference sponsors, "that in proportion as these objectives are accomplished, the depression will recede, unemployment will decrease and dependable national prosperity will return."

In the opinion of observers at the sessions, these goals were such as caused general approbation but the contention of the critics of the alcohol gasoline project is that the method to be used in that particular case to bring about that portion of the results do not square with the basic plan.

Declared Impossible

Observers were inclined to attach some significance to the remarks made by Irenee DuPont, Wilmington, Del., vice chairman of the board of E. I. DuPont de Nemours & Co. After a short formal speech at the May 7 dinner he stated that the DuPont organization for a long time had made alcohol from molasses, recovering the various by-products. He asserted his company had been able to produce the alcohol about as cheaply as it is possible, but that it had been found impossible to make alcohol as cheaply as gasoline. Under the circumstances, he stated, he felt that every gallon of alcohol added to gasoline was an economic waste. He asserted that before gasoline might rise to the price of alcohol some new synthetic product might intervene which would prevent such parity. Later he indicated he had not receded from this belief despite efforts of others at the conference toward other conclusions.

Attendance at the conference was largely made up of agriculturists, chemists and representatives of such industries as would be interested in such projects as listed above. Some unbiased observers, referring to the alcohol blending projects, stated the proceedings were like trying a case before a jury which already had formed its conclusion as to the defendant's guilt or innocence. An atmosphere generally favorable to the project was noted.

Dr. William J. Hale, consulting chemist of Washington, D. C., who has frequently espoused the cause of alcohol motor fuel, asserted that many years ago there was a rough parity between the tonnages of the products of the mines and agriculture. With the development of the internal combustion engine, the tonnage shifted to the mines. The only way definitely to restore prosperity will be to cause a swing back to equality between the two, he asserted. To accomplish this, it must be arranged to consume a large amount of the products of agriculture, thus aiding the farmer, reemploying the idle and restoring the balance. He said it mattered little that present costs of producing alcohol from farm products might be high. He predicted a cost of 6 cents a gallon for alcohol as being entirely possible.

About the only direct answer given the challenge from the American Petroleum Institute was the agreement of Mr. Garvan to appoint a committee to study the offer. The general belief is that the challenge will not be accepted.

Proponents Heard

Another speaker in favor of power alcohol was D. B. Gurney, president of the House of Gurney, Yankton, S. D., who operates some 500 service stations in the Northwest and who has sold blended alcohol through some or all of those stations for some time. He detailed experiences thus far with the product. He asserted his experiments started with a 2½ per cent alcohol blend at a few stations and that the business at those stations showed a large increase in comparison with others. Gradually extending the plan, he found the results highly favorable, and his total volume has shown a large gain compared with his business when he sold straight gasoline. Mr. Gurney is engaged in an extensive radio advertising and sales campaign in the interests of his business. He is operator of station WNAX and is secretary of the Mount Rushmore National Memorial Commission.

It is understood that in Mr. Gurney's present operations he is selling the blended product to the consumer at the same price as nonblended gasoline and is bearing the increased cost of adding 2½ per cent alcohol.

Others on the program of the alcohol-gasoline session were Wheeler McMillen, farm paper editor; William W. Buffum, Montclair, N. J., general manager of the Chemical Foundation; and Fred M. Zeider, vice president of engineering, Chrysler Corp. Others speaking at other sessions included D. Howard Doane, president of the American Society of Farm Managers; Edward A. O'Neal, president American Farm Bureau Federation; Mr. J. R. Heiple, Gridley, Ill., long an advocate of the alcohol gasoline project and others.

As one of the few definite results of the conference, Chairman Garvan was empowered to name a committee of 15 members of the conference to effect a permanent organization and to set up a definite plan for co-ordinating agriculture, science and industry.

Offer of Institute

The offer of the Institute to the conference through a letter to Mr. Garvan also was read to the conference by Doctor Brown. It follows:

"From time to time our attention has been called to the past and present activities of the Chemical Foundation in advocating and proposing alcohol blended motor fuels.

"It is probably unnecessary to state that the petroleum industry does not share the optimism expressed by your organization as to alcohol gasoline blends. Neither can our industry conceive of any public benefit which may occur as a result of the proposal to make mandatory the blending of alcohol with gasoline.

"It is evident that a decided difference of opinion exists in the minds of technical and engineering experts. Therefore we should like to propose that the petroleum industry jointly participate with your organization in financing and arranging for an impartial economic and technical investigation by competent disinterested experts as to the relative merits of alcohol gasoline blends and straight gasoline.

"We are addressing this letter to you as president of the Chemical Foundation, Inc., to express our desire to join with your organization in equally underwriting the cost of such an investigation and study. The American Petroleum Institute stands ready to assume one-half of the necessary expense to conduct such research with the provision that the total cost thereof will not exceed $30,000."

Opposition to the pending plan previously expressed by various interests were directed not only against the increased expense of handling and the higher prices of blended fuels, but also against the compulsory use feature of blend legislation. Legislation proposed would force consumers to use blended fuels by levying upon straight gasoline a tax so high as to make its price prohibitive. It has been pointed out also that blended fuels were marketed in this country several years ago but were withdrawn because of consumer dissatisfaction arising from higher costs, faulty motor operation and starting difficulties caused by separation of the blend alcohol and gasoline, and damage done to the finished surfaces by spilling.

Doctor Brown's Address

In his address, Doctor Brown said in part: "The petroleum industry, which markets all the motor fuel and sells nearly one-quarter of its products to the farm population, and obtains most of its raw material, crude oil, from farm leases, is in entire sympathy with the objects of this convention and of the sincere proponents of blending alcohol with motor fuel; but after careful technical and economic study it has reached the conclusion that blending agricultural alcohol with gasoline is an impractical, uneconomic method, doomed to failure as a means of providing a broader outlet for farm products under any conditions existing or likely to exist in this country for many years.

"There is no doubt that alcohol blends have been, are and can be used as motor fuel without loss in maximum power output of the motor, but only with an increase in consumption and more difficult operation in cold weather. We have been told by Mr. DuPont that even the cheapest anhydrous alcohol produced from black strap molasses with complete utilization of all by-products cannot compete in any way with gasoline as a motor fuel, and that every gallon of alcohol so used in place of gasoline is an economic waste. E. C. Smith reported as the result of an extensive marketing experiment in rural Illinois that they were unable to find an economic way to market farm surplus as alcohol in motor fuel.

"In the face of this experience we must consider carefully this proposal to blend alcohol with motor fuel in order that an ill-advised step may not endanger the success of a broad constructive program.

"Chemistry has contributed greatly to agriculture, particularly in the last two decades, and agriculture has contributed many important new raw materials for chemistry to the mutual benefit of both. We have heard of a new and important source of cellulose from southern pine. Soy bean oil competes economically with other materials, particularly as an ingredient of many paints and varnishes. Rayon produced synthetically from American cotton is a satisfactory and much cheaper substiute for imported silk. Cellulose nitrates and cellulose acetates have opened new horizons in the fields of plastics, protective coatings and protective wrappings of material. Corn has proven the cheapest source of butyl alcohol, which is of great importance in the modern lacquer industry.

"These successful developments have resulted only from the sound economic development of new industries based upon the results of intensive, scientific research. The economic success of these developments is due to the fact that they yield a satisfactory or superior product at an equal or lower cost.

Cost Analyzed

"It is conservatively estimated that the farmers use approximately 23 per cent of the gasoline consumed in the United States. This blending of alcohol would therefore increase the farmers' motor fuel bill by 23 per cent of $830,000,000, or $191,000,000. In return they would obtain a market for such corn as would be needed to make 1,658,664,000 gallons of alcohol, equal to one-tenth of the total

(Continued on Page 89)

Domestic Demand for Motor Fuel at New Record in First Quarter

By C. O. WILLSON

Domestic motor fuel demand the first quarter of this year established a new record based on refinery shipments with a gain in total demand (domestic demand plus exports) of 1 per cent over the same period in 1934. The total demand is not as great as the peak year of 1930 due to the large shrinkage in exports over the past four years.

The March report of the Bureau of Mines from which the above comparisons were derived shows a substantial gain in motor fuel demand both in export and domestic markets during March and this fact accounts for the favorable showing for the entire quarter. The February report had shown that the domestic motor fuel demand for the first two months of this year was running slightly behind 1934. The report covering March operations reveals a small gain over the same month in 1934 in export shipments and a 7 per cent gain in domestic shipments.

The improvement shown in March in regard to consumption in this country is in line with predictions of several oil company statisticians whose investigations had pointed to a substantial gain in gasoline demand for that month following a less favorable situation earlier in the year. These same statisticians are certain that April domestic consumption was ahead of April, 1934. These data are interpreted to mean a heavy gasoline demand for coming months with a record domestic demand for the year in prospect. The economists, however, are slow in predicting the entire year, pointing out that this is partially dependent on business conditions the last half year which cannot be accurately gauged at this time.

Increase in Supplies

Aside from the data on the domestic gasoline demand there was little in the March report of the Bureau of Mines considered alone or as part of the accumulative data for the first quarter, to which those hopeful of improved marketing conditions, could point. As in January and February, the March data show large increases in crude oil production, crude oil runs to stills and increases in supplies of most refinery products in excess of the indicated requirements. Crude oil production averaged 2,629,000 bbls. in March and 2,589,000 bbls. for the first quarter. This compares with 2,437,000 bbls. in March, 1933, and 2,366,000 bbls. daily for the first quarter of that year.

The bulk of this increased production amounting to close to 200,000 bbls. daily was run to refinery stills and this in turn was reflected in increased output of refinery products. For the entire industry this situation is summarized in the data of the accompanying table which show that for the first quarter there was a gain of 9.2 per cent in total supply of all oils with an increase in demand of only 1 per cent. When comparisons are made in refinery operations as given in the table, the increases in total supplies for the first quarter range from 3.8 per cent to 15.1 per cent with changes in total demand ranging from 1.5 per cent increases to 1.1 per cent decreases.

Stocks Not Excessive

In the case of motor fuels the supplies exceeded the demand by 13,890,000 bbls. for the first quarter, that amount going to storage at refineries and water and pipe line terminals. This seasonal increase in gasoline stocks was 100 per cent greater than the same period in 1934. In regard to gasoline operations those in touch with the industry's stabilization program maintain that increases in stocks have been in line with seasonal conditions and are not excessive. Their program is based on the working requirements of individual companies throughout the year with stocks to be increased or decreased under a definite program which aims to keep crude runs to stills on a fairly even basis throughout the year with fluctuations in demand to be taken care of through storage programs including inter-refinery buying should stocks become excessive in the tanks of a few operators. It is said that the recent improvement in tank car and service station prices reflects the success of this program which will continue through the year.

In regard to total stocks of all products, the situation in the industry as a unit, has been aided by the heavy withdrawals from inventories of fuel oil and gas oil. Due to these reductions the gain in total stocks the first quarter was

(Continued on Page 100)

Crude Oil and Refinery Situation Summarized —First Three Months, 1935-1934

Supply and Demand—Crude Oil (Bbls.)

First three months—	Total supply	Total demand	Excess Demand	Excess Pct.	Domestic production	Imports¶	Indicated domestic demand‡	Exports	Stocks refinable crude March 31
1935	237,446,000	235,561,000	*1,885,000	*.8	232,966,000	4,480,000	227,107,000	8,454,000	339,139,000
1934	220,567,000	220,805,000	238,000	.1	212,974,000	7,593,000	213,424,000	7,381,000	354,067,000
Increase, 1935	16,879,000	14,756,000			19,992,000	†3,113,000	13,683,000	1,073,000	†14,928,000
Increase, 1935	7.7%	6.6%			9.4%	†41.0%	6.4%	14.5%	†4.2%

Supply and Demand—Refinery Products—Motor Fuels (Bbls.)

First three months—	Total supply	Total demand	Excess Demand	Excess Pct.	Domestic production	Imports	Domestic demand	Exports	Stocks March 31
1935	106,348,000	92,458,000	†13,890,000	†15.0	106,348,000		86,491,000	5,967,000	65,657,000
1934	98,393,000	91,497,000	†6,896,000	†7.5	98,393,000		84,992,000	6,505,000	66,191,000
Increase, 1935	7,955,000	961,000			7,955,000		1,499,000	†538,000	†534,000
Increase, 1935	8.1%	1.0%			8.1%		1.7%	†8.2%	†.8%
Kerosene									
1935	15,017,000	14,581,000	†431,000	2.8	15,017,000		12,855,000	1,726,000	6,834,000
1934	13,044,000	14,612,000	1,568,000	12.0	13,044,000		12,614,000	1,998,000	4,986,000
Increase, 1935	1,973,000	†31,000			1,973,000		241,000	†272,000	1,848,000
Increase, 1935	15.1%	†.2%			15.1%		1.9%	†13.6%	37%
Gas Oil and Fuel Oil									
1935	83,075,000	100,016,000	16,941,000	20.4	80,296,000	2,779,000	93,643,000	6,373,000	99,380,000
1934	79,413,000	101,127,000	21,714,000	27.3	78,913,000	500,000	94,823,000	6,304,000	106,286,000
Increase, 1935	3,662,000	†1,111,000			1,383,000	2,279,000	†1,180,000	69,000	†6,906,000
Increase, 1935	4.6%	†1.1%			1.7%	455.0%	†1.2%	1.1%	†6.5%
Lubricating Oil									
1935	6,454,000	6,508,000	54,000	.8	6,454,000		4,471,000	2,037,000	7,277,000
1934	6,215,000	6,408,000	193,000	3.1	6,215,000		4,385,000	2,023,000	6,837,000
Increase, 1935	239,000	100,000			239,000		86,000	14,000	440,000
Increase, 1935	3.8%	1.5%			3.8%		.2%	.06%	6.4%
Petroleum Wax (Lbs.)									
1935	115,949,000	110,500,000	†5,449,000	†4.9	109,480,000	6,469,000	58,106,000	52,394,000	141,809,000
1934	143,687,000	126,656,000	†17,031,000	†11.8	128,800,000	14,887,000	70,215,000	56,441,000	86,644,000
Increase, 1935	†27,738,000	†16,156,000			†19,320,000	†8,418,000	†12,109,000	†4,047,000	55,165,000
Increase, 1935	†19.3%	†14.6%			†15.0%	†56.5%	†17.3%	†7.1%	63.6%

*Excess supply. †Decrease. Note—Total supply equals domestic production plus imports. Total demand equals domestic demand plus exports. Data on demand for refined products are based on refinery shipments. ‡Crude oil only. §Includes natural gasoline. ¶For domestic use.

Crude Oil Runs to Stills and Total All Oils (Bbls.)

First three months—	Total imports§	Total exports§	Total crude to stills	Nat. gasoline production	% Gasoline yield from crude oil‡	Total supply all oils*	Total demand all oils*	Stocks all oils March 31
1935	7,392,000	25,259,000	222,903,000	9,461,000	46.4	255,063,000	248,382,000	570,829,000
1934	8,172,000	24,856,000	209,789,000	8,838,000	46.1	233,546,000	245,740,000	590,019,000
Increase, 1935	†780,000	403,000	13,114,000	623,000	.3	21,517,000	2,642,000	†19,190,000
Increase, 1935	†9.5%	1.6%	6.2%	7.1%	....	9.2%	1.0%	†3.2%

*Total all oils includes crude refined products, natural gasoline and benzol. †Decrease. ‡Includes natural gasoline blended at refineries. §Includes crude oil and refinery products. In case of gas oil and fuel oil and wax, imports includes only products for domestic use. All data based on Bureau of Mines reports.

Cathodic Protection on Pipe Lines By Wind Driven Generator Unit

By NEIL WILLIAMS
Gulf Coast Bureau, The Oil and Gas Journal

HOUSTON, Tex., May 13.—Application of cathodic protection to pipe lines in places not accessible to electric power lines has been made practical by Texas Pipe Line Co. in the development of a wind driven generator unit. For several months this company has had one such unit in operation on a bad section of its Dayton-Port Arthur line and so successful has it been, additional installations are being made at other "hot spots" on this and other lines.

The use of the wind driven generator unit is expected to be very adaptable in sections where the wind blows frequently, the Gulf Coast, West Texas and Oklahoma. The unit has been designed to operate with wind velocity as low as 2 miles per hour, and there are few areas, if any, which do not have winds of at least that velocity most of the time.

Research and tests made in cathodic protection of pipe have indicated the loss of effect of polarization is only gradual after charging of current is stopped, and that it is not necessary for current to be charged continuously. It is the opinion of engineers of Texas Pipe Line Co. that even if the generator is run only 80 per cent of the time adequate protection will be provided under ordinary circumstances.

Installation Described

A wind driven generator in itself is not especially new—it is only the application of such equipment for this particular purpose not done before. The installation includes a direct current generator specially wound to protect it against overloading at high speeds and to give a constant current at variable speeds. A generator capable of developing from 10 to 100 amperes is sufficient. This is equipped with a two-bladed propeller, which drives the generator through a speed increasing gear, and is mounted on a bed plate. With collector rings, the whole assembly is mounted on a turn table with Timken bearings, and, in the initial installation, is set up over the pipe line on an "A" frame tower of 7-inch top, 45-foot poles. A wind vane holds the unit into the wind.

The size of the unit naturally is dependent upon current requirements, governed by several factors, such as soil resistance, condition of pipe coating and area affected. Also, the length of the propellers is dependent on the size of the generator and power requirements. Propellers on units now being installed range from 12 to 14 feet.

An automatically operated brake stops the unit when the wind reaches dangerous velocity. This can be set at any point desired. Ordinarily this would be for a wind of 25 to 30 miles per hour. As winds of such velocity usually are gusty and of short duration, stopping of the generator for them does not result in any excessive shutdown time.

The equipment has been built for Texas Pipe Line Co. by Brance-Krachy, electrical engineers, who have worked with engineers of that company in perfecting the unit and putting it into operation.

In this first installation, the unit is set up directly over the line, with one line leading directly to the pipe to which it is welded. The ground bed for the charging of the current into the soil is 1,000 feet long and leads to a ground. This line is strung on poles as shown in an accompanying picture.

Procedure of Installation

Here, again, there naturally can be no set specifications or procedure of installation. The location of the generator is optional while the distance and nature of the lead-off, etc., are variable depending on factors to be determined in advance of installation. There is nothing particularly involved in the ground bed which can be anything to provide a good ground connection. The ground bed in Texas Pipe Line Co.'s first installation is built entirely of junk pipe, eight sections or legs being embedded firmly in the ground upright with another section being welded across the top of them, to which the lead-off line is anchored.

Sufficient power is generated in this initial installation to be felt for 12 miles along the pipe and full protection is believed provided for 5 miles. On the section of pipe being polarized by the wind generated current no leaks have been noticed since the unit was put in operation although previously the section ran two or more leaks every month.

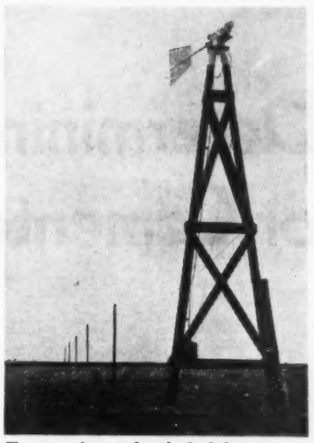
Before the installation was attempted tests were made with a portable welding unit to determine the potential of the soil along this section of pipe and the amount of current necessary to offset the discharge from the pipe. With this calculated it was a simple matter to provide a generator of sufficient capacity and lay out the ground bed.

Electrolysis has always been one of the biggest problems in pipe line maintenance. It has cost the industry large sums and trouble in pipe reconditioning and replacement, and has occasioned a great deal of research into means of combating, or rather, counteracting it. The results which several companies have obtained in tests with cathodic protection, or the charging of electric current into places of low potential or resistance along the line where electrolysis is active is focusing attention of corrosion engineers on the possibilities of this means of pipe protection. While there has been considerable divergence of opinion among engineers as to the practicability of neutralizing or offsetting the discharge of electrical energy from the pipe into spots of low potential, there now is growing belief much may be learned on the subject.

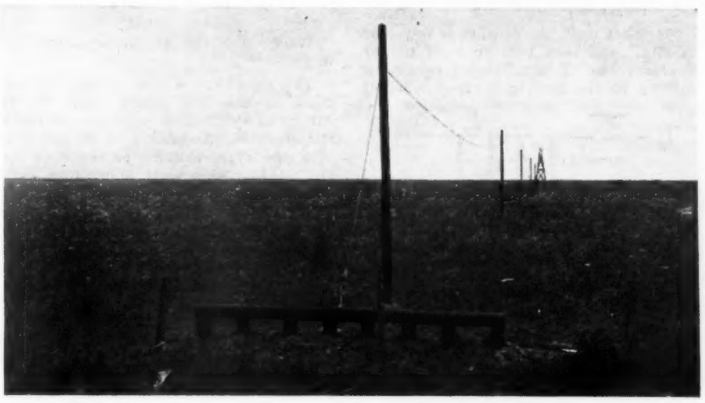
Tests Already Made

So far the tests made of necessity have had to be in "hot spots" reasonably close to power lines. There small motors have been set up to drive D.C. generators or equipment has had to be put in for reduction and conversion of the A.C. current in the power lines to the direct current required for the cathodic protection. Stringing of lines to isolated places and setting up required equipment there has been considered too costly for carrying on tests in those spots. Thus came the development of the wind driven generator. For operators who feel the necessity of more continuous charging of current into the soil, it is suggested the wind driven generators can be used to charge batteries from which continuous current can be obtained.

Engineers of Texas Pipe Line Co. now are considering the feasibility of developing a generator utilizing water power for operation which would be installed in rivers or other streams at line crossings. Successful application of cathodic protection to pipe at such points would save the industry tremendous sums.



Front view of wind driven generator set on a "hot spot" on the Texas Pipe Line Co.'s Dayton-Port Arthur line for cathodic protection to the line. The propeller is moving so rapidly it cannot be seen



Installation of wind driven generator for cathodic protection of pipe at a point on the Texas Pipe Line Co.'s Dayton-Port Arthur line showing the ground bed and the lead off line from the generator

Field Operations Started in April Show Big Increase Over Record in March

An increase of 100 completed wells was recorded in the summary of field operations east of California in April, and in new work there was a gain of 105 in rigs and 248 in drilling wells. The number of new operations started in April was 2,034, rigs and drilling wells, while the new operations started in March totaled 1,581, an increase in April of 453 operations of which 348 were drilling wells.

Following is the summary:

SUMMARY OF ALL FIELDS

Wells Completed

	Comp.	Prod.	Dry	Gas
Pennsylvania Grade	211	203	16	27
Lima	6	0	3	3
Central Ohio	54	51	15	32
Indiana	14	60	4	8
Kentucky	21	540	3	2
Michigan	25	6,130	6	11
Kansas	100	56,297	15	3
Oklahoma	153	59,310	46	6
North Central Texas	220	10,573	93	2
West Texas	66	24,293	19	1
Texas Panhandle	57	29,336	5	7
East Central Texas	21	1,468	9	4
East Texas	409	23,425	9	0
East Texas (gas field)	1	0	1	0
Gulf Coast Texas	101	10,532	48	4
Southwest Texas	110	33,085	28	3
North Louisiana	29	408	9	11
Gulf Coast Louisiana	37	13,338	18	2
Arkansas	9	177	7	0
Mississippi	1	0	0	1
Montana	9	610	2	1
New Mexico	22	60,375	2	0
Wyoming	5	5,025	2	1
Total April	1,681	335,236	360	129
Total March	1,581	572,442	324	105
Difference	100	237,206	36	24

Rigs and Wells Drilling

	Rigs	Drlg.	Ttl.
Pennsylvania Grade	68	239	307
Lima	7	31	38
Central Ohio	38	122	160
Indiana	0	36	36
Illinois	0	8	8
Kentucky	0	13	13
Michigan	130	140	270
Kansas	53	221	274
Oklahoma	99	452	551
North Central Texas	88	237	325
West Texas	62	171	233
Texas Panhandle	43	151	194
East Central Texas	17	38	55
East Texas	120	236	356
East Texas (gas field)	3	13	16
Gulf Coast Texas	47	131	178
Southwest Texas	27	125	152
North Louisiana	20	62	82
Gulf Coast Louisiana	24	74	98
Arkansas	13	44	57
Alabama	1	3	4
Mississippi	4	13	17
Montana	17	48	65
Wyoming	10	65	75
Colorado	2	29	31
New Mexico	27	87	114
Utah	1	13	14
Total April	921	2,802	3,723
Total March	816	2,554	3,370
Difference	105	248	353

Determining How Much of a Frozen or Cemented Column of Pipe Is Free

By J. T. HAYWARD
Barnsdall Oil Co., Tulsa*

Drill pipe and casing sometimes accidentally become stuck in the hole. Some method of finding out where the pipe is frozen is then desirable, so that decisions can be made as to whether to make further efforts to free it, or to cut or shoot it off and side track. In the latter case what we require to know is how much is frozen so that a shot can be properly placed, or the knife run a minimum number of times and yet recover as much as possible. The object of the present paper is to outline methods for determining where the pipe is stuck, or conversely how much is free.

There is another direction in which this information may be useful. It is becoming of increasing importance, when casing is cemented, to know how far up the column is actually cemented. There are, for instance, occasions when it is important that the cement should not come up beyond a certain height and cover an upper show that could be later exploited by cutting and pulling the pipe or perforating with the gun. At other times, it is wished to bring the cement above a certain level, so that water may be shut off from oil sands behind the pipe, and the latter later produced through perforations. It is also probable that too much cement is often used on a job on account of the uncertainty, leading to unnecessary expenditure on cement, excessive back pressure on the producing formation where this has already been drilled, and the loss of pipe if and when the well is abandoned.

The assumptions, made when calculating the number of sacks of cement required to reach to a given height behind a column of casing, contain a number of possibilities of error. It is suggested that, after a column of pipe has been cemented and before drilling is resumed, the height to which the cement has actually risen and formed a bond be checked and recorded for future reference. The following two methods for determining the amount of pipe that is free have been worked out and used with success in practice.

First Method

This depends upon the weight indicator, the underlying principle being to change the longitudinal stress in the column while measuring the change in stretch, and from the data so obtained to calculate the free length. This method is not new, but the manner in which it is carried out and the precautions taken to minimize errors due to friction are, the writer believes, published for the first time.

If the weight indicator does not read in pounds, the readings in points must be converted to pounds; and if the indicator is on the dead line and indicates the line pull, the readings converted to pounds must be multiplied by the number of lines going to the traveling block, the product giving the pounds pull exerted by the hook.

Examine the weight indicator, and make the adjustments recommended by its maker to insure proper working.

Lash a wooden lath, or stick or strip of paper vertically on the pipe at such a height that marks can be made upon it corresponding to the stretch of the pipe in the hole when various pulls are taken in it. Care should be taken to select a base, or fixed point to mark from, that does not settle when the load on the derrick is increased.

Determine two readings on the weight indicator, such that the lower corresponds to a pull on the pipe that is something more than sufficient to take the slack out of it, and the higher to the maximum pull that is considered safe. Call these two readings respectively, "T-min." and "T-max."

Slack off until the tension is less than "T-min." and then pull up until the indicator reads "T-min.," being careful to pull up to the reading without slacking

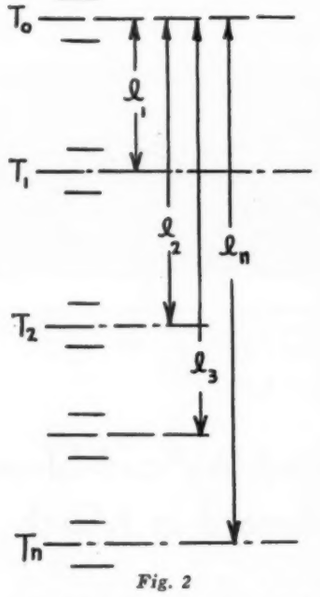


Fig. 2

off. Mark the strip of paper with a horizontal line, and call this mark "M."

Now pull up to some tension greater than "T-min." and slack off carefully until the indicator reads "T-min." and again mark the strip, calling this mark "N." Owing to friction in the sheaves and of the pipe in the hole, mark "N" will probably be some distance below mark "M".

Repeat the above operations at "T-max." and obtain another two marks, "R" and "S," on the strip. Remove the strip of paper and draw a line, "G," between and equi-distant from "M" and "N," and draw another line, "F," between and equi-distant from "R" and "S". The marks on the strip should now appear as in Fig. 1. The distance "F" to "G" is the stretch in the column, caused by a change in total tension, of "T-max." minus "T-min." (See Fig. 1).

Let e = the stretch in inches.
A = the cross-sectional area of the pipe in square inches.
P = "T-max." minus "T-min." in pounds pull on column.
E = Young's modulus—30,000,000.
L = free length of column in the hole.

Then:

$$L = \frac{E \times e \times A}{12P} \quad \text{.....(1)}$$

Since pipe is usually listed and specified according to weight per foot rather than cross-sectional area, the following equation may be more convenient than equation (1).

$$L = \frac{E \times e \times w}{40.8P}$$

Where w = the weight in pounds per foot.

The accuracy of the result will depend, in the first place, upon the accuracy of the weight indicator. A recent test made by the writer of an indicator of a new type, working on the dead line and reading in pounds, showed an error not exceeding plus or minus 2 per cent. While it is probable that the average indicator under ordinary working conditions does not attain this accuracy, it can be approached by careful attention to the adjustment of the instrument. Fortunately for the present purpose, differential measurements with the indicator are much more accurate than absolute readings; and if the instrument is in good condition and is properly adjusted before the test, it is believed that an error not exceeding plus or minus 5 per cent can be depended upon.

Another possible source of error lies in the assumed value for "E", and the effect upon it of the joints; but it is believed that this is actually negligible. If the string of pipe be considered as a homogeneous column of constant cross-section equivalent to the wall of the pipe, give in the joints will reduce the apparent value of "E", while the additional thickness at the coupling will increase the value of "E," the two effects being in opposition and tending to neutralize each other. Again, in any column of pipe in a well, the sum of the lengths of the joints is small as compared with the total length of pipe, and variations in the stress/strain relationship at the joints would have a corresponding small effect upon the ratio for the column as a whole.

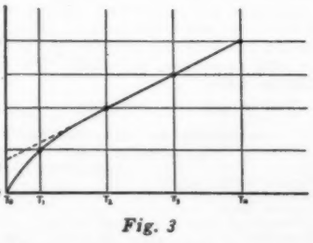


Fig. 3

That 30,000,000 is not far from the correct value for "E" appears to be borne out in practice. Limited tests carried out by one of the pipe companies indicated that the effect of the joint was negligible. Again, in the cases where the writer has used the method outlined above to endeavor to determine the position at which a column of pipe was frozen,

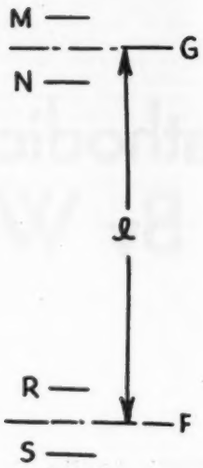


Fig. 1

the subsequent operations at three of them have furnished a check upon the correctness of the calculations and indicated an error of less than 5 per cent.

A further possible error may be introduced if the measured stretch includes slack in the column as well as true strain. Usually it is not dififcult to determine when the slack has been taken up; but if there is any doubt, one of the following methods can be used. If the column of pipe is not too long, "T-min." may be made equal to the weight of the pipe. For long columns, where the weight may approach the safe pull, the following procedure may be followed:

Instead of using two readings, "T-min." and "T-max.," select several, "T-0," "T-1," "T-2," "T-n," etc., so that "T-0" is zero and "T-n" is the maximum pull that it is considered safe to put on the pipe. At each of these readings obtain the stretch, pulling up to and slacking off to each indicator reading, and bi-secting the distances as already described. The marks on the strip of paper will then appear as in Fig. 2.

Plot the strains against the tensions as in Fig. 3. If there is any considerable buckling of the pipe in the hole when slacked off, the slope will change as the slack is taken up, but will become straight when true elastic strain commences. The slope of the straight part of the curve above this point gives the relationship between the tension and the elastic strain, and the free length of pipe in the hole may be determined by a modification of equation (1) as follows, for the case shown in Fig. 3:

$$L = \frac{E \times A \times (e_n - e_3)}{12(T_n - T_3)}$$

or

$$L = \frac{E \times w \times (e_n - e_3)}{40.8(T_n - T_3)}$$

Referring to Fig. 3, $e_n - e_3$ represents the amount of slack.

Second Method

With this method no weight indicator is required, and it is not necessary to know the value of "E". It depends upon the following principle. Let two unequal lengths, "L-1" and "L-2", be marked off on a homogeneous test piece (Fig. 4). If the longitudinal tension is increased without exceeding the elastic limit, the strains in the two lengths will be proportional to their lengths. If "e-1" be the change in length caused by the change in stress in "L-1" and "e-2" the change in "L-2", then:

$$\frac{e_1}{e_2} = \frac{L_1}{L_2}$$

and

$$L_2 = L_1 \times \frac{e_2}{e_1} \quad \text{.....(2)}$$

Applying this method to our problem:

(Continued on Page 89)

*Presented before mid-year meeting, A. P. I., Tulsa.

Polymer Gasoline Has Higher Blending Value Than Pure Iso-octane

By V. N. IPATIEFF and GUSTAV EGLOFF
Universal Oil Products Co.*

A commercial polymerization unit recently put into operation is processing 3,000,000 feet a day of cracked gas and producing about 5 gallons of polymer gasoline per 1,000 feet. This gasoline has an octane rating of 80-82 Motor Method, and its blending value is higher than that of benzene or iso-octane.

The unit is operating under mild conditions of temperature and pressure, using a solid catalyst. The stabilizer gas being processed contains about 20 per cent of propylene and butylenes. Cracked gases are made up of paraffin hydrocarbons and also members of the olefinic series, including ethylene, propylene and butylenes. These olefins react at relatively low temperatures and pressures in the presence of the solid catalyst to produce polymer gasoline. The following data were obtained from the operation of two pilot polymerization plants of 400 and 85,000 feet daily capacity:

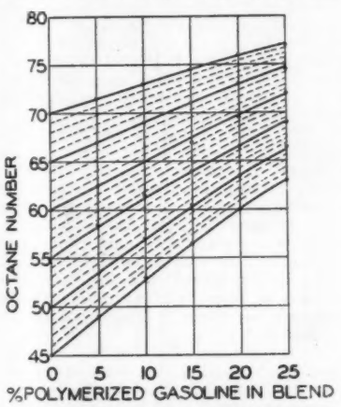


Fig. 1—Blending value of polymerized gasoline when blended with straight-run-gasolines-blends of refinery fuels, C-8 & A-3

Mid-Continent Straightrun

A continuous 22-day run was made in a semicommercial polymerizing plant. The operating conditions were about 3,500 feet of gas per hour, temperature 475° F., and 160 pounds gauge pressure. The gas being processed was passed through a heating coil under the stabilizer pressure of 160 pounds and delivered into the three insulated catalyst chambers connected in series flow.

In the first part of the run the hydrogen sulphide (0.8 per cent by volume) was not removed from the stabilizer gas and part of it appeared in the polymer gasoline as sulphur compounds, mostly mercaptans, due to the interaction of hydrogen sulphide with the olefins present in the gas. In the second part of the run the hydrogen sulphide was removed from the stabilizer gas before polymerization by scrubbing with 23° Be. caustic soda solution.

The sulphur present in the polymer gasoline is a function of the hydrogen sulphide content of the gas being processed. With caustic scrubbed gas the sulphur content of the liquid polymer approaches zero. In the present run the polymer gasoline produced from the unscrubbed gas contained 0.63 per cent of sulphur (76 per cent of which was mercaptans), whereas the gasoline from the scrubbed gas was doctored sweet and contained only 0.02 per cent of sulphur.

The compositions of the inlet gas to the process and of the outgoing gas are presented in Table 1, the values being obtained by low temperature Podbielniak distillation. Hydrogen sulphide was removed from the gas before distillation. Columns 1 and 2 list the actual analytical figures of the inlet and outlet gases, whereas Column 3 has been corrected for the shrinkage of the gas due to polymerization. Columns 1 and 3, therefore, represent the relative volumes of the various components of the ingoing and outgoing gases. That is, for every hundred feet of inlet gas there were 74.7 feet of outlet gas. The routine analytical method used in plant control consisted in the absorption of propylene and butylenes by means of 87 per cent sulphuric acid.

TABLE 1—ANALYSES OF INLET AND OUTLET GASES

Gas—	1 In., %	2 Out., %	3 Out., % × 0.747
Noncondensibles	5.5	2.4	1.8
Ethylene	2.9	5.0	3.7
Ethane	13.4	33.9	25.2
Propylene	15.3	4.9	3.7
Propane	39.4	37.6	28.2
Isobutylene	3.8	0.3	0.2
n-butylenes	5.9	1.4	1.1
Butanes	12.9	14.5	10.8
Pentanes and higher	0.9	0.0	0.0
Total	100.0	100.0	74.7

Stabilizer Gas Containing Hydrogen Sulphide

Run data obtained with unscrubbed stabilizer gas (containing 0.8 per cent of hydrogen sulphide) are presented in Table 2 which shows the operating conditions, the olefin content of the gas, the extent of olefin polymerization, and the yield of liquid polymer.

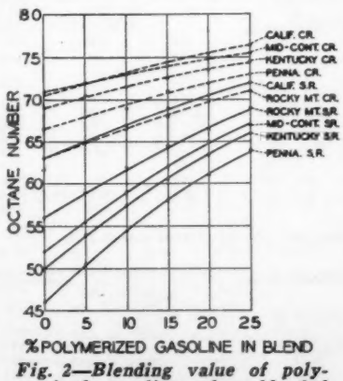


Fig. 2—Blending value of polymerized gasoline when blended with straight-run and cracked gasoline from various crude sources

TABLE 2—OPERATING DATA

Operating conditions:	
Hours on test	444
Gauge pressure, lbs./sq. in.	160
Temperature, °F.	475
Inlet gas rate, cu. ft./hr.	3,430
Outlet gas rate, cu. ft./hr.	2,566
Higher olefin content of inlet gas:	
Propylene and butylenes, per cent	26.2
Higher olefin content of outlet gas:	
Propylene and butylenes, per cent	8.3
Olefin polymerization:	
Propylene and butylenes, per cent	76
Liquid polymer production:	
Gallons per 1,000 cu. ft.	4.7

Distillation and other characteristics of the crude liquid polymer as produced are presented in Table 3.

TABLE 3—CRUDE LIQUID POLYMER (FROM UNSCRUBBED GAS)

Gravity, °A.P.I. at 60° F.	69.9
Gum, Mg./100 cc. (copped dish)	23
Gum, Mg./100 cc. (air jet)	10
Per cent sulphur, total	0.63
Per cent sulphur, mercaptan	0.48
Octane No. (C.F.R. motor method)	82
Induction Period, minutes	90
Reid vapor pressure	12.8

100 cc. A.S.T.M. Distillation

	°F.
Initial B.P.	89
Per cent distilled over:	
10	140
20	169
30	192
40	204
50	214
60	224
70	245
80	289
90	355
Endpoint	415
Total per cent over	95
Per cent bottoms	1
Per cent loss	4

TABLE 4—DATA ON 22-DAY RUN

Operating conditions:	
Hours on test	93
Gauge pressure, lbs./sq. in.	160
Temperature, °F.	475
Inlet gas rate, cu. ft./hr.	3,520
Outlet gas rate, cu. ft./hr.	2,617
Higher olefin content of inlet gas:	
Propylene and butylenes, per cent	24.4
Higher olefin content of outlet gas:	
Propylene and butylenes, per cent	9.7
Olefin polymerization:	
Propylene and butylenes, per cent	71
Liquid polymer production:	
Gallons per 1,000 cu. ft.	3.6

Stabilizer Gas Free from Hydrogen Sulphide

The stabilizer gas containing 0.8 per cent of hydrogen sulphide was passed from the stabilizer of the reforming unit through a 23° Be. caustic soda solution at 150° F. This treatment reduced the hydrogen sulphide to less than 0.01 per cent.

Run data from this part of the 22-day run are shown in Table 4 and the distillation and other characteristics of the crude liquid polymer as produced are presented in Table 5.

TABLE 5—CRUDE LIQUID POLYMER (FROM SCRUBBED GAS)

Gravity, °A.P.I. at 60° F.	67.2
Gum, Mg./100 cc. (copper dish)	51
Gum, Mg./100 cc. (air jet)	10
Per cent sulphur, total	0.02
Per cent sulphur, mercaptan	0.0
Octane No. (C.F.R. motor method)	82
Induction period, minutes	46
Reid vapor pressure	10.6

100 cc. A.S.T.M. Distillation

	°F.
Initial B.P.	94
Per cent distilled over:	
10	158
20	186
30	199
40	207
50	215
60	224
70	241
80	277
90	333
Endpoint	415
Total per cent over	95
Per cent bottoms	1
Per cent loss	4

TABLE 6—ANALYSES OF INLET AND OUTLET GASES

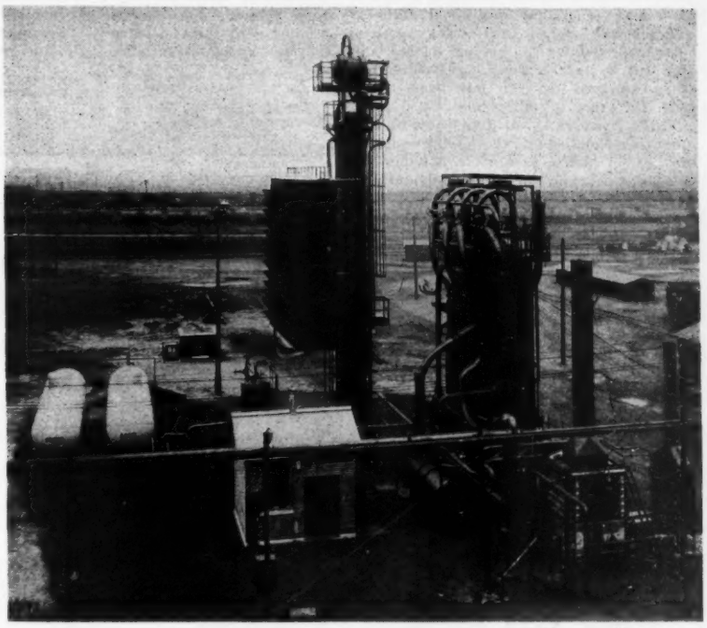
Gas—	1 In., %	2 Out., %	3 Out., % × 0.787
Noncondensibles	19.8	26.4	20.8
Ethylene	14.9	17.5	13.8
Ethane	19.8	26.5	20.8
Proplyene	19.4	7.2	5.7
Propane	18.2	19.4	15.2
Isobutylene	1.8	0.0	0.0
n-Butylenes	3.8	0.0	0.0
Butanes	1.5	3.0	2.4
Pentanes and higher	0.8	0.0	0.0
Total	100.0	100.0	78.7

Gas Obtained from "Vapor Phase" Cracking of Mexican Gas Oil

In the vapor phase cracking of Mexican gas oil, gases containing various percentages of olefins are produced. A blend of the absorption tower and stabilizer tower gases was made in the proportion in which they were produced in a commercial cracking unit making 6,500,000 feet of gas per day, five volumes of absorption gas to one of stabilizer.

The mixed gas was polymerized at 175 pounds gauge pressure, temperatures of 450 and 500° F. and at feed rates of 3.9 and 5.6 feet per hour per pound of catalyst.

Analyses of the inlet and outlet gases



Universal Oil Products Co.'s 3,000,000 cubic feet a day polymerization plant. In the foreground is the preheater for cracked gas. Directly back of that the vertical catalytic polymerization chambers. At the left, stabilizer for the polymer gasoline. The small brick building at the left of the catalyst towers is the receiver house

*Presented before mid-year meeting of A.P.I. in Tulsa. Author's title, "Polymer Gasoline from Cracked Gases."

are listed in Table 6. Columns 1 and 2 give the actual gas analytical figures, whereas the values in Column 3 have been corrected for the change in gas volume due to polymerization. That is, for every hundred feet of inlet gas there were 78.7 feet of outlet gas.

Table 7 presents run data showing the operating conditions, the olefin content of the gas before and after polymerization, and the yield of liquid polymer.

TABLE 7—OPERATING DATA

Test Number—	1	2
Operating conditions:		
Hours on test	60	264
Gauge pressure, lbs./sq. in.	175	175
Temperature, °F.	450	500
Inlet gas rate, cu. ft./hr./lb. of catalyst	3.9	5.6
Higher olefin content of Inlet Gas		
Propylene and butylenes, %	26.3	27.2
Higher olefin content of outlet gas:		
Propylene and butylenes, %	7.5	4.2
Olefin polymerization:		
Propylene and butylenes, %	77	88
Liquid polymer production:		
Gallons per 1,000 cu. ft.	3.7	3.8

Table 8 presents distillation and other characteristics of the crude liquid polymer as produced.

TABLE 8—CRUDE LIQUID POLYMER

Test Number—	1	2
Gravity	59.7	60.2
Sulphur, %	0.14	0.14
Octane No. (C.F.R. M.M.)	80	80
Reid vapor pressure	5.3	5.6
100 cc. A.S.T.M. Distillation		
	°F.	°F.
Initial B.P.	135	121
Per cent dist.:		
10	198	188
20	216	204
30	229	216
40	240	228
50	256	239
60	274	259
70	299	286
80	328	318
90	390	370
Endpoint	487	476
Total per cent over	96.5	97.0
Per cent bottoms	1.0	1.5
Per cent loss	2.5	1.5

Stabilizer Gas Obtained From "Liquid-Vapor Phase" Cracking of Mid-Continent Gas Oil

The stabilizer gas was processed at 100 and 155 pounds gauge pressure and 450° F. with varying time factors. The contact times were varied from 24 to 173 seconds. The propylene-butylene content of the gas averaged 35 per cent. The liquid polymer production per 1,000 cubic feet ranged from 5.6 to 8.4 gallons.

Table 9 presents average gas analytical data for the inlet and outlet gases. Columns 1 and 2 list the actual gas analysis figures, whereas the values in Column 3 have been corrected for the change in gas volume due to polymerization.

TABLE 9—ANALYSES OF INLET AND OUTLET GASES

Gas—	1 In., %	2 Out., %	3 Out. % × 0.671
Noncondensibles	0.0	0.0	0.0
Ethylene	0.7	1.1	0.7
Ethane	6.1	10.0	6.7
Propylene	18.4	3.5	2.3
Propane	46.3	71.8	48.3
Isobutylene	4.4	0.2	0.1
n-Butylenes	10.1	2.4	1.6
Butanes	13.1	9.8	6.6
Pentanes and higher	0.7	1.2	0.8
Hydrogen sulphide	0.2	0.0	0.0
Total	100.0	100.0	67.1

The processing of the stabilizer gas was continued for eight days during which time four different sets of operating conditions were tested in order to determine the effect of contact time on the quality of the liquid polymer. The results are shown in Tables 10 and 11.

Table 11 presents distillation and other characteristics of the crude liquid polymer as produced during the four tests.

The boiling range of the polymer product does not affect the octane rating to any extent. Table 12 presents data from the above runs which show the effect of contact time upon the extent of polymerization, and upon the yield and boiling range of the liquid polymer.

Propane-Propylene and Butane-Butylene Fractions

In some refineries the stabilizer for producing the vapor pressure gasoline desired is operated so as to yield a propane-propylene and a butane-butylene fraction or mixtures thereof. These separate fractions and a mixed fraction were studied with the view of producing liquid polymer and substantially olefin-free gas, i.e., propane, butane, or a mixture of propane and butane.

The gases were processed at 450° F. and 100 pounds pressure at gas rates of 0.05 to 0.25 cubic feet per hour per pound of catalyst. Under these operating conditions, 92 to 99 per cent of the olefin content of the gas was removed in the form of liquid polymer.

Analyses of the inlet and outlet gases are given in Table 13 accompanying. Columns 1 and 2 show the actual gas analysis figures, whereas the values in column 3 have been corrected for the change in gas volume due to polymerization.

Run data are presented in Table 14 showing the operating conditions, the olefin content of the gases before and after polymerization, the extent of olefin polymerization, and the polymer yields. Each gas was processed at two feed rates.

Distillation and other characteristics of the crude liquid polymer are presented in Table 15.

TABLE 10—RESULTS OF TEST

Test number—	1	2	3	4
Operating conditions:				
Hours on test	48	48	48	42
Gauge pressure, lbs./sq. in.	100	155	155	155
Temperature, °F.	450	450	450	450
Inlet gas rate, cu. ft./hr./lb. of catalyst	1.1	4.4	6.7	11.4
Higher olefin content of inlet gas:				
Propylene and butylenes, per cent	37.5	34.6	34.3	36.0
Higher olefin content of outlet gas:				
Propylene and butylenes, per cent	0.3	4.0	6.2	10.4
Olefin polymerization:				
Propylene and butylenes, per cent	99	92	87	79
Liquid polymer production:				
Gallons per 1,000 cu. ft.	8.4	7.4	6.6	5.6

TABLE 11—CRUDE LIQUID POLYMER

Test number—	1	2	3	4
Gravity	62.7	66.4	67.8	66.6
Sulphur, per cent	0.12	0.23	0.32	0.31
Octane number (C.F.R. M.M.)	81	80	82	81
Reid vapor pressure	14.0	13.9	14.0	12.5
100 cc. A.S.T.M. Distillation				
	°F.	°F.	°F.	°F.
Initial B.P.	95	89	84	104
Per cent dist.:				
10	158	164	148	166
20	188	194	182	189
30	210	209	196	199
40	235	221	211	206
50	258	234	222	214
60	292	254	238	225
70	327	290	262	244
80	372	328	310	293
90	460	420	372	352
Endpoint	531	439	413	411
Total per cent over	94.0	91.5	92.0	93.5
Per cent bottoms	1.5	1.5	2.0	2.0
Per cent loss	4.5	7.0	6.0	4.5

TABLE 12—EFFECT OF CONTACT TIME ON EXTENT OF POLYMERIZATION AND YIELD AND BOILING RANGE OF POLYMER

Test number—	1	2	3	4
Contact time, seconds	173	65	42	24
Inlet gas rate, cu. ft./hr./lb. of catalyst	1.1	4.4	6.7	11.4
Polymerization of propylene and butylenes, per cent	99	92	87	79
Gallons of liquid polymer/1,000 cu. ft. of gas	8.4	7.4	6.6	5.6
90 per cent point, °F.	460	420	372	352
Endpoint, °F.	531	439	413	411

TABLE 13—ANALYSES OF INLET AND OUTLET GASES

	Propane-Propylene Fraction			Butane-Butylene Fraction			Propane-Propylene Butane-Butylene Fraction		
	1	2	3	1	2	3	1	2	3
	In.	Out.	Out% × 0.828	In.	Out.	Out% × 0.604	In.	Out.	Out% × 0.620
Gas—	%	%		%	%		%	%	
Non-Condensibles	0.8	0.8	0.7	2.2	6.1	3.7	6.7	6.0	3.7
Propylene	28.9	0.0	0.0	4.4	2.0	1.2	10.0	2.2	1.4
Propane	70.3	93.8	77.6	9.1	27.8	16.8	29.4	47.2	29.3
Butylenes	0.0	0.0	0.0	33.6	0.5	0.3	28.0	2.3	1.4
Butanes	0.0	0.0	0.0	50.7	60.2	36.3	25.9	42.3	26.2
Pentanes and higher	0.0	5.4	4.5	0.0	3.4	2.1	0.0	0.0	0.0

TABLE 14—OPERATING DATA USING LIMITED FRACTIONS AS FEED

	Propane-Propylene Fraction		Butane-Butylene Fraction		Butane-Butylene Propane-Propylene Fraction	
Test number	1	2	3	4	5	6
Operating conditions:						
Hours on test	20	20	20	12	17	22
Gauge pressure, lbs./sq. in.	100	100	100	100	100	100
Temperature, °F.	450	450	450	450	450	450
Inlet gas rate, cu. ft./hr./lb. of catalyst	0.12	0.05	0.19	0.10	0.25	0.10
Olefin content of inlet gas:						
Propylene and butylenes, %	26.6	29.3	35.0	41.0	39.6	43.6
Olefin content of outlet gas:						
Propylene and butylenes, %	2.6	0.4	4.6	0.4	3.4	1.4
Olefin polymerization:						
Propylene and butylenes, %	92	99	92	99	95	98
Liquid polymer production:						
Gallons per 1,000 cu. ft.	3.8	3.0	8.4	7.2	7.5	7.5

TABLE 15—CRUDE LIQUID POLYMER

	Propane-propylene fraction		Butane-butylene fraction		Propane-propylene butane-butylene fraction	
Test number:	1	2	3	4	5	6
Gravity	57.9	59.3	60.5	60.3	62.5	60.2
Sulphur, per cent	0.37	...	0.02	...	0.02	0.03
Reid vapor pressure	...	...	15.6	...	...	16.3
100 cc. A.S.T.M. Distillation						
	°F.	°F.	°F.	°F.	°F.	°F.
Initial B.P.	110	104	80	90	84	100
Per cent dist.:						
10	180	148	136	128	116	154
20	204	172	186	164	156	196
30	224	194	228	202	198	230
40	246	216	256	232	230	258
50	270	250	290	262	258	286
60	302	286	330	304	294	326
70	338	330	372	358	350	374
80	384	374	422	404	420	428
90	460	431	574	538	370	612
Endpoint	570	516	574	586	602	612

TABLE 16—ANTIKNOCK CHARACTERISTICS OF POLYMER GASOLINE

Gravity	62.7	59.9	66.4	67.8	66.6
100 cc. A.S.T.M. Distillation					
	°F.	°F.	°F.	°F.	°F.
Initial B.P.	95	94	89	84	104
Per cent dist.:					
10	158	145	164	148	166
20	188	181	194	182	189
50	258	268	234	222	214
90	460	484	420	372	352
Endpoint	531	510	439	413	411
Octane No. (C.F.R. M.M.)	81	81	80	82	81
Octane blending value (25 per cent in Fuel A-3 of 44 Octane No. (C.F.R. M.M.)	118	118	116	120	116

Table 16 presents antiknock characteristics of the polymer gasoline.

Properties of Polymer Gasoline

The outstanding characteristics of polymer gasoline is its high octane number and blending value. The distillation range can vary considerably without affecting its antiknock qualities, as shown in Table 16.

Polymer gasoline has higher blending value (Table 17) than either benzene or iso-octane, although its straight octane value is lower, 81 versus 97 and 100, respectively. Its blending value becomes higher, the lower the octane number of the base fuel with which it is blended.

Tables 18 and 19 list the octane numbers of various blends of steam-distilled polymer gasoline (E.P., 390° F.) with straightrun and with reformed gasoline.

Table 20 shows the distillation characteristics of the three gasolines—polymer, straightrun and reformed—used in these blends.

The accompanying curves (Figs. 1 and 2) present graphically the blending characteristics of polymer gasoline at different concentrations in a number of base fuels. The family of curves in Fig. 1 makes it possible to predict approximately the octane number that can be expected from blending polymer gasoline with different motor fuels.

The boiling range of the liquid polymer is a function of the operating conditions. By proper choice of the time, temperature, and pressure variables, the distillation range of the liquid polymer can be varied at will. The sulphur content of the polymer gasoline can also be controlled. In case a sulphur-free crude polymer is desired, the gas being processed is freed from hydrogen sulphide before polymerization. This is readily accomplished by a caustic soda wash.

Crude polymer gasoline has low oxygen bomb stability, but high susceptibility to inhibitor. One hundredth of 1 per cent (0.01%) of wood distillate inhibitor is usually sufficient to produce a gasoline of satisfactory stability.

Table 21 lists the gum, oxygen bomb stability, antiknock, and other characteristics of four typical crude polymer gasolines as produced in a semi-commercial plant from stabilizer gas.

Reactivation of the Catalyst

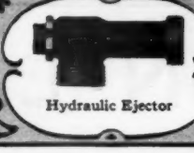
The solid catalyst gradually loses its activity with continued use but it is readily regenerated with a controlled volume of air which burns off the highly polymerized or carbonaceous material that deposits upon the catalyst. This reactivation step has been carried out a number of times, each time bringing the catalyst back to its original activity. The 22-day run reported in this paper was made with a catalyst which has been regenerated in the tower used for polymerization.

Grateful acknowledgment is hereby made for the assistance of Dr. B. B. Corson, Mr. E. R. Kanhofer, Mr. W. H. Hubner, and Dr. F. J. Skowronski.

Summary

Experiments are described concerning the polymerization of five samples of cracked gases in semi-commercial polymerization units. The operating conditions of gas rate, temperature and pressure varied from 0.05 to 11.4 cubic feet per hour per pound of catalyst, 450° F. to 500° F., and 100 to 175 pounds per

(Continued on Page 99)


Hydraulic Ejector

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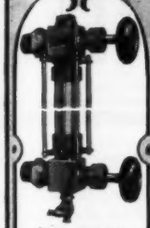
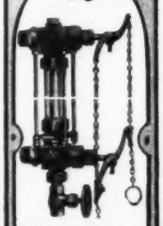

"Safeguard" Automatic Liquid Level Gage

Automatic Injector

TRADE PENBERTHY PRODUCTS MARK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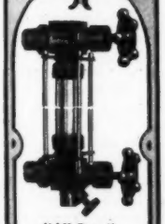
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NEWS FROM FOREIGN LANDS

GERMANY

The increasing use of wood-gas generator automotive vehicles has caused the state of Prussia to promote the creation of suitable service stations throughout that area, according to a report from the American consulate-general Berlin, made public by the Commerce Department.

It is planned, the report states, that such stations will be connected with sawmills, lumber yards and the larger woodworking plants.

Individuals desiring to establish such a wood-gas service station will be able to receive fuel wood in large quantities from the state forests at a 50 per cent reduction from the market price. They must, however, bind themselves to maintain adequate stocks of suitable, air-dried wood on hand at all times and to sell it to consumers at prices specified by the state government. The service stations, according to the report, will be inspected from time to time by forestry officials.

VENEZUELA

Crude oil production in Venezuela averaged 382,378 bbls. daily in April, an increase of 10,500 bbls. daily above the March but below the averages for February and January. The April average was 15,000 bbls. daily above April, 1934.

It is probable that the April production would have been 10,000 to 15,000 bbls. greater had it not been for the transportation conditions along the bar connecting Lake Maracaibo to the Gulf of Venezuela. This situation practically suspended shipments for a few days according to reports from Venezuela early in April. Conditions improved later in the month and boats were again able to load within a few inches of their usual capacity. Due to the action of the tide and trade winds the shipping channel is constantly changing and often causes temporary inconvenience in the movement of crude from the Maracaibo Field.

This situation in regard to transportation early in the month accounts for the lower average production of the Caribbean Petroleum Co. in the Mene Grande Field during April. It is said that the production was reduced to 12,000 bbls. daily early in the month. This situation changed and production was gradually increased and was reported to be around the normal output of 40,000 bbls. daily at the close of the month. The operations of other companies were not materially affected by transportation conditions. Most of the companies have storage facilities which are used when it is impossible to maintain normal shipments out of the lake region.

With the exception of the Quiriquire Field and Mene Grande there were no important changes in the production of the several fields when compared with March production. The production of the Quiriquire Field averaged in excess of 56,000 bbls. daily in April, a gain of over 10,000 bbls. when compared to March and the largest in the history of the field. This represents an increase of approximately 20,000 bbls. daily above the production in April, 1934. The consistent increase shown by this field is aiding in centering considerable attention on the possibilities of discovering additional fields in that section. It is expected that several additional wildcat tests will start drilling over the last half of the year.

Due largely to this increased production in Quiriquire the Creole Petroleum Corp. shows the largest gain in production among the companies operating in Venezuela. The Standard Oil Co. of Venezuela which is owned by the Creole operates the Quiriquire Field. The Creole's share in the Lagunillas Field also increased in April. The daily average production of the company in April of 78,640 bbls. compares with 64,650 bbls. in March and 54,570 bbls. in April last year.

The following table gives the estimated production by companies and fields for April, 1935 and 1934 (data in barrels):

Field—	1935	1934
Lagunillas	6,207,145	5,340,000
Mene Grande	1,782,335	2,050,000
Quiriquire	910,000	1,219,900
Tarra	437,460	560,900
Cumarebo	235,836	331,190
Concepcion	116,790	150,900
El Mene	75,800	88,400
La Paz	15,530	19,870
Total	11,471,344	11,028,660
April (daily average)	382,378	367,620
March	371,900	351,620
February	390,020	348,900
January	405,156	350,270
Companies—		
Lago Pet. Corp.	3,381,497	3,410,290
Venezuela Oil Concessions, Ltd.	2,869,362	2,907,100
Creole Pet. Corp.	2,359,225	2,637,200
Venezuelan Gulf Oil Corp.	1,438,000	1,206,970
Caribbean Pet. Co.	910,000	1,206,970
Colon Oil Corp.	437,460	562,300
British Controlled Oilfield, Ltd.	75,800	88,600
Total	11,471,344	11,028,660

U. S. S. R.

The following table summarizes oil operations in U.S.S.R. for March with comparative data for February, 1935, and March, 1934:

PRODUCTION OF CRUDE OIL

	March, 1935	% of plan	February, 1935	March, 1934	1935 % of 1934
Azneft	1,619,500	90.1	1,461,400	1,619,800	100.0
Grozneft	229,400	74.0	211,800	345,700	66.4
Maineft	35,600	81.3	86,200	76,600	111.7
Embaneft	20,200	84.2	14,700	20,700	97.6
Other trusts	65,200	95.7	41,600	28,350	229.9
Total	2,019,900	87.7	1,815,700	2,091,150	96.6

DRILLING (in meters)

Azneft	88,347	110.1	68,337	74,230	119.0
Grozneft	22,762	112.6	14,511	21,951	103.7
Maineft	10,106	187.1	3,102	3,784	267.1
Embaneft	6,189	137.5	3,225	2,056	301.0
Other trusts	8,783	119.0	12,336	8,414	104.4
Total	136,187	113.9	101,511	110,435	123.3
Consisting of:					
Production drilling	89,745	119.5	70,852	79,332	113.1
Wildcatting in producing fields	25,557	96.9	17,272	18,464	138.4
In new areas	20,885	115.4	13,387	12,639	165.2

RUNS TO STILLS

Azneft	1,112,500	96.8	1,025,600	1,183,800	94.0
Grozneft	534,200	86.9	514,600	546,200	97.8
Aviafuel	19,900	180.9	14,300	20,700	96.1
Sredazneft	6,900	116.9	4,000	2,400	287.5
Total	1,673,500	94.0	1,558,500	1,753,100	95.5

PRODUCTION OF GASOLINE

Azneft	91,200	93.3	88,300	93,200	97.8
Grozneft	134,400	101.8	119,500	134,900	99.6
Aviafuel	11,000	138.2	9,700	1,800	611.1
Sredazneft	1,200	171.4	420	300	400.0
Deduct inter-refinery transfers	....	....	1,200	9,900	....
Total	237,300	100.4	216,720	220,300	107.9

AUSTRALIA

Under the sponsorship of the Anglo-Persian Oil Co., Ltd., and the Commonwealth Oil Refineries, Ltd., investigations are being made in Australia to determine that country's possibilities from the standpoint of crude oil shale oil production. The Commonwealth company which is owned jointly by the Anglo-Persian and the government of Australia owns and operates a refinery with large distributing facilities in that country.

The decision to investigate the possibilities of Australia as to the production of raw materials used in the refining of petroleum products followed the visit of Sir John Cadman, head of the Anglo-Persian, last year. Several independent geological surveys have been made in parts of Australia in recent years but it is now planned to correlate all the information.

The geological committee as appointed consists of Prof. Henry Payne, director of C.O.R. (Commonwealth Oil Refineries, Ltd.), chairman; Prof. Ernest Skeats, Melbourne University; Dr. W. G. Woolnough, commonwealth geological adviser; Dr. Keith Ward, government geologist for South Australia. Some time in June or July this committee will be joined by an outstanding oil geologist to be appointed by the Anglo-Persian company. The geological committee is now preparing data which will be closely studied over the next few months to determine whether or not actual tests shall be made of promising geological formations in scattered parts of Australia.

Part of the investigation in regard to the producing possibilities of Australian shale oils has been completed. As representatives of the Anglo-Persian company, R. Crichton, general manager of the Scottish Oils, Ltd., and H. R. J. Conacher of the same company recently spent several weeks in Australia obtaining first-hand information regarding the shale deposits in the eastern states.

Commonwealth Operations

The current issue of "Accelerator," official publication of the Commonwealth Oil Refineries, Ltd., contains reports covering the operations of the company which are constantly being expanded. It was announced that the company has closed a contract with the Broken Hill Proprietary, Ltd., Newcastle, to purchase the latter's output of benzol. The C.O.R. has erected a 21,000-bbl. storage tank at Newcastle and will ship the benzol by tanker to Melbourne refinery as it is accumulated. The company expects to start the sale of the benzol-gasoline blend in June.

The company has also announced its intention of selling a gasoline-alcohol blend in Queensland. The Queensland government at one time passed a law requiring petrol (gasoline) sellers to purchase certain amounts of alcohol to be sold as motor fuel after blending with gasoline. This law was eventually held unconstitutional but the C.O.R. has decided to continue the purchase of its quota in order to assure the continued operations of distilleries which are important to agricultural interests. The company expects to offer this gasoline-alcohol product in Queensland within the next two months.

The C.O.R. is erecting new storage at its terminal located at Spotswood (Melbourne). These seven tanks will have a capacity of approximately 190,000 bb's. This terminal, located on the north bank of the Yarra River, is the storage point for all crude oil received from Persia for the refinery. The crude is unloaded to storage and then pumped 7 miles to the refinery located at Laverton. Part of the refinery products are pumped back to this terminal and held there for shipment in bulk tankers to distributing points in Australia.

Refined products from the refinery are also pumped to Port Melbourne, which is located on the far side of the Yarra River. The northern and western districts of Victoria are supplied by tank trucks from the refinery. Some of the products are delivered in cases. The refinery has its own facilities to manufacture these packages. The company's principal distributing centers are: Port Melbourne, Berry's Bay (Sydney), Newcastle (N.S.W.), New Farm (Brisbane), and Birkenhead (S.A.).

Scene in the Venezuelan fields

Late Fields

OKLAHOMA

Edward H. Moore and others extended the Fitts Pool southeasterly with their No. 1 Atkins, NW NW NW Section 32-2-7, Pontotoc County, which flowed 427 bbls. the first hour and 354 bbls. the second hour. Bromide was found at 3,925 feet; sand at 4,010 feet and McLish at 4,048-60 feet, total depth. Moore and associates at once made six locations in Section 32 of which they own all but 40 acres. Five locations are in the NW quarter and one in NW NE NE quarter.

Carter Oil Co. completed No. 1 Smith, NW NE NE Section 31-2-7, which flowed 467 bbls. the first hour. Total depth was 3,275 feet, 3 feet in McLish.

Delaney and others' western extension well in NE SE SE Section 26-2-6, was tested on Sunday and flowed an average of 410 bbls. per hour for six hours.

Phillips Petroleum Co.'s No. 7 Norris, NW NE SW Section 25-2-6, had Bromide at 4,125 feet, sands at 4,202 and 4,277 feet, total depth 4,320 feet. It flowed 925 bbls. in one hour through casing and 209 bbls. the second hour through tubing, and produced gas at the rate of 15,000,000 feet per day.

Sinclair Prairie Oil Co.'s wildcat test, No. 1 Koatsch, SW cor. Section 23-15-3w, Logan County, flowed 85 bbls. in 24 hours by heads from Wilcox sand at 6,322-33 feet. The crew was getting ready for a swabbing test.

Magnolia Petroleum Co.'s No. 2, C NE NW NE Section 18-7-4, Pottawatomie County, swabbed and flowed a potential of 422 bbls. in 48 hours.

KANSAS

T. M. Deal, of the T. M. Deal Oil & Gas Co., says the company has not abandoned the location for No. 5 McElwain, NW SE SE Section 34-23-4w, Reno County, Kansas, as had been reported from the field. The company drilled No. 6 first to protect offset wells and Mr. Deal says No. 5 will be drilled.

Shell Petroleum Corp.'s No. 1, C SE SW NW Section 3-33-2, Sumner County, had Wilcox sand at 3,436 feet and Siliceous lime at 3,486 feet, and a dose of sulphur water at 3,495-3,500 feet.

GULF COAST

HOUSTON, Tex., May 14.—Texas Co.'s No. 1 H. C. Wehmeyer, 1½ miles southwest of production in Port Lavaca Field, Calhoun County, was washed in from a plugged back depth of 6,261 feet and is flowing 70 per cent oil and 30 per cent wash water through a one-quarter inch choke, with tubing pressure 120 pounds. The gas pressure is gradually increasing, indicating a good producer.

Magnolia to Build 30,000-Barrel Combination Unit

BEAUMONT, Tex., May 14.—The Magnolia Petroleum Co. is segregating material and clearing the site for a 30,000-bbl. combination skimming and cracking unit to be built in the local refinery. A contract has been given the M. W. Kellogg Co. for the design and construction of the new unit. When completed, the new equipment will produce a motor fuel of high octane value and will replace old equipment that has operated over a long period of time.

HAMAKER SUCCEEDS NAZRO

Rex G. Hamaker, vice president in charge of sales for Reed Roller Bit Co., Houston, Texas, was elected a director of that organization last week to succeed the late Underwood Nazro.

CANADIAN GASOLINE EXPORTS

Exports of gasoline and naphtha from Canada in February amounted to 17,884 gallons at $2,438 against 2,789 gallons worth $480 in January.

Imports of gasoline lighter than .8235 specific gravity in February totaled 716,952 gallons valued at $64,683 against 1,073,830 gallons worth $91,361 in January. All came from the United States.

Overproduction in the East Texas Field Declines Following Court Action

By L. E. BREDBERG

FORT WORTH, Tex., May 13.—Overproduction is on the decline in East Texas, mainly due to the attitude taken by the federal and state courts, especially pertaining to oil impounded in open storage, the Federal Court sitting at Houston denying three operators permission to move such oil, which immediately "froze" large quantities of earthen impounded crude and by-products. After this decision the problem arose what to do with such oil. Nature took care of a considerable quantity when it poured such a torrent of rain the Sabine River freed the oil which created a fire hazard to leases and wells along the river. Other pits are in danger of having their walls broken by the flood. This is another argument against open storage that the commission and attorney general's department might use in combating further storing in such pits.

Tucker Royall, chairman of the Railroad Commission tender committee, expressed the opinion this week the East Texas Field was in better condition than at any time since the tender committee became effective.

R. W. Fair, also member of the tender committee, said, "I think we are doing better but I think there are smarter men in the 'hot' oil business than in the attorney general's department or the commission. But I think that those two bodies are doing their best. I think the field is in better shape than since Section 9(c) was killed."

W. F. Weeks, attorney for the Texas Petroleum Council, thought some improvement could be made, but the future looked brighter. He also thought there could be a better system of records but perhaps the commission did not have a sufficient force.

One of the last bills to pass the legislature before adjournment was a law regulating truck transportation of gasoline. This bill was specifically intended to stop transportation of illegal crude products by trucks over the state.

Shipments

Tank car shipments for the week ending May 4 were 942 cars, divided as follows:

	Cars	Gallons
Gasoline	459	3,700,546
Fuel oil	189	1,837,572
Casinghead gasoline	135	1,156,434
Distillate	61	490,564
Kerosene	48	402,174
Gas oil	25	205,793
Topped crude	18	179,488
Residuum	4	32,555
Naphtha	3	24,570
Total	942	

Of these, 145 cars went out under Federal tenders. No products were shipped under court orders. Interstate shipments were 469 cars, intrastate shipments 253 and coast wise movements 220 cars. For the week ending May 11, 955 cars of products were shipped out, 13 cars under the previous week. However, the 942 cars were a 129-car drop under the week before.

The first receivership of a refinery in the field under the new conservation law, was ordered by Judge Walter Russell of the Seventh Judicial District Court on May 8. The American Refining Co. of Big Sandy, was placed in receivership with H. C. Davis, receiver. An injunction was granted April 4 restraining the refinery from violating proration orders and on April 26 the attorney general's department petitioned to have the company placed in receivership on the allegation the injunction had been violated.

The receivership suit against the Acme Refining Co., heard three weeks ago in Longview, has not yet been decided.

Refinery Operations

There were only 24 refineries operating in the field this week, processing only 37,210 bbls. per day, a drop of 11,000 bbls. per day, with 9 less refineries operating.

May 22 the Railroad Commission is to hold a hearing at Kilgore for adopting a standard on recovery of gasoline and other products. There are many different types and sizes of plants in the field, and no doubt all have a different recovery, and make different grades of products from "3.2" to the best grade of motor fuel.

The newly signed oil confiscation bill which allows the state to confiscate oil or products produced in violation of the rules and regulations of the Railroad Commission will have an exemplary effect. Overproduction is expected to fall off immediately, now the commission has received these added powers.

Gas Polymerization and Solvents Refining Topics

(Continued from Page 25)

of selective solvents that might be under investigation, Ulric B. Bray, Ralph C. Pollock and David R. Merrill of the Union Oil Co. presented a paper which clarified the entire problem.

A multiple batch method was described and through the use of an analytical fractionation procedure, it was shown possible to determine whether any particular stock contains a sufficient proportion of an oil of specific quality to make the manufacture of such oil economically feasible.

This paper was followed by one prepared from data collected by the Union Oil Co. and reported by David R. Merrill, C. C. Moore, Jr., and Ulric Bray. Actual service tests were run using solvent refined and ordinary oils for comparative purposes. Particular attention was paid to bearing wear, sludge formation in the crankcase of the engine, and carbon deposition in the motor as affecting the octane requirement of the engine motor fuel.

D. J. MORAN

Treasurer, American Petroleum Institute

It was found that wear was a function of the paraffinicity of the lubricating oil, the low gravity, high viscosity gravity constant components showing many times the wear of the highly paraffinic fractions. Also, no difference was shown between the wear characteristics of highly paraffinic oils of wide and narrow boiling range. Using solvent refined oils the octane requirement of the gasoline appeared to increase only about 1 per each 1,000 miles of travel while an increase of 1 was shown for each 300 to 400 miles of travel when the car was lubricated with good nonsolvent refined lubricant.

Further light was thrown on what constitutes a good lubricant in a paper prepared by D. P. Barnard and E. R. Barnard of the Standard Oil Co. (Indiana) in which the authors discussed "Oiliness," a characteristic which thus far cannot be expressed as a measurable quantity and yet is a most important factor in judging lubricating oil quality.

Not as a part of the solvent oil symposium but in further interest to manufacturers of lubricating oils, W. W. Scheumann and J. F. Stewart of the Empire Oil & Refining Co., described an apparatus for the evaluation of crude oils to determine not only their light oil yield value but whether they may be processed to make lubricants. The apparatus included an atmospheric distillation unit, stabilizer, vacuum flash distillation unit and vacuum fractionating unit, all of exceptionally simple and yet effective design.

Fundamental Research

Touching upon a highly technical and yet fundamental study, Frederick D. Rossini presented a paper on the chemical constitution of the gasoline and lubricating oil fractions in petroleum. His work was done under the direction of the Institute as research project number 6. His work showed that 35 different hydrocarbons had been isolated and identified in the fraction boiling below 180° F. Six others have been detected and are being investigated further and some 20 others were thought to be present in significant quantities but further work will be necessary to prove their presence.

The means used to isolate these hydrocarbons include distillation, crystallization, adsorption, extraction and chemical reactions. To date, the work done on the lubricating oil fraction covers only the segregation and refinement of a suitable fraction from the crude. The fraction has been dewaxed, extracted with sulphur dioxide and has been treated with silica gel with the result the product is a water white, pure fraction. The author proposes now to fractionate the oil with respect to molecular size and type and to segregate such fractions.

A subject of more general interest to the practical man present was that discussed in a paper by Dr. G. C. Wilson, of the University of Wisconsin, which showed it is possible to produce a good Diesel motor fuel from cracked products.

He appealed for co-operation between refiner and engine builder in the establishment of specifications for Diesel fuel, declaring that the rapid progress in developing the gasoline motor was due to parallel developments in both fields. Present economic advantages of Diesel operation, he said, are dependent upon a low-cost fuel and since the refining trend is toward an increase in cracking to produce gasoline the Diesel must have a fuel other than straightrun gas oil, a desirable and necessary cracking stock.

Doctor Wilson outlined suggested typical Diesel fuel specifications, after which the Institute brought representatives of petroleum refiners and of Diesel engine builders for a round-table discussion of their mutual problems.

Monthly Allocations

Turning to the nontechnical side of the refining business, Fred Van Covern of the Planning and Coordination Committee presented a paper in which he explained the method by which the allocated gasoline production is established each month and how the various allocating committees and district offices correlate the work among refiners in each area so that the summation of the individual company allocations equals the national figure established by the federal oil administrator.

During the week there were several refinery committee meetings including one on accident prevention in refineries, measuring and sampling natural gasoline, standardization of refinery equipment, testing methods and refinery technology.

THE OIL AND GAS JOURNAL

Producing Refining Natural Gasoline Pipe Line

Published weekly by

THE PETROLEUM PUBLISHING COMPANY

114-16 West Second Street, Tulsa, Oklahoma

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Alcohol Conference Fails

The Dearborn conference which revived the discussion of alcohol for power failed to make out a case for the substitute fuel. Since alcohol cannot compete in price or performance with gasoline the substitution could be made only at increased cost contrary to the history of all successful substitutes which have marked economic progress by providing "a satisfactory or superior product at an equal or lower cost."

The kerosene lamp displaced the tallow candle because it provided better light; illuminating gas displaced the kerosene lamp and electric light displaced the gas lamp for the same reason.

Rayon was a satisfactory substitute for silk at a greatly reduced price. The consumer was not invited to pay silk prices for rayon to help the cotton farmers of the South. The theory that we should step backward in buying motor fuel to aid the farmer should have stopped us from ever buying a motor car because of displacing the horse and depriving the farmer of his feed market.

Helping the farmer has been a stalking horse in politics for generations. This alcohol campaign is not new. Thirty years ago Congress was being besieged by an agitation for denatured alcohol. "Remove the tax on denatured alcohol" was the cry, "and we will see the greatest industrial development in the nation's history."

Congress swallowed it whole, passed the bill removing the tax on denatured alcohol and, with the rest of the country, sat back to watch for results. "It was expected that the removal of the tax would result in the extensive use of this fuel for power purposes" said a 1910 year book, but the developments hoped for were not realized. It was another chain letter experiment.

Now the same arguments are being presented to another generation although it remains true as then stated in a United States Geological Survey Bulletin that "denatured alcohol will, probably, not be used for power purposes to any great extent until its price and the price of gasoline become equal, and the equality of gasoline and alcohol engines in respect to service required and quantity of fuel consumed becomes more generally realized."

Until alcohol can compete on an equal basis of price and performance with gasoline it would be contrary to all economic law, common sense and thrift to make the substitution.

The Dearborn conference heard the comment of the chairman of the DuPont company that although his company could make alcohol as cheaply as possible it had been found impossible to make alcohol as cheaply as gasoline.

Legislation proposed to force consumers to use a blended product by placing a tax on straight gasoline is a confession that alcohol cannot compete except at the expense of the public.

It remained for Dr. George Granger Brown to expose just what that cost would be and who would have to pay it, the farmers included. To provide alcohol equal to one-tenth of the motor fuel consumed the farmer would secure a market at current prices worth $422,000,000 but he would have to pay $191,000,000 more for motor fuel, the net result being that he would have sold his corn and barley for 57½ cents instead of 85 and 70 cents a bushel.

"The balance of the nation would be taxed $639,000,000 in increased cost of motor fuel to cover this increased consumption of farm crops." In other words "the consumers would pay $1.25 per bushel for this corn and barley in order to return 57½ cents to the farmer."

That is not all the story. While we are supposed to be helping the farmer we are taking away ten per cent of the gasoline industry's market, tearing down one section of the country's business in an abortive effort to build up another. How, for example, about the farmers in the great oil producing states who have found oil their most valuable crop, either in royalties, bonuses or revenues to the states which have lightened the farmer's tax burden? How about the industries, businesses and communities which owe much of their turnover to the custom of the oil industry?

No argument for alcohol for power can stand up unless on even terms and when it is able to compete with gasoline on an equality there will be no need for a conference on it or oratory about helping the farmer. The buyer will be the judge.

Mr. Ickes' Blast

Administrator Ickes' modest assumption of the entire credit for the improved condition of the oil industry is characteristic of the average politician "pointing with pride" to his imaginary achievements. But what he is really concerned about is the growing opposition to further extension of Federal control over the petroleum industry. That is what provokes his outbursts.

And, like any ordinary politician, in the heat of argument he loses all sense of proportion and asserts what he wishes people to believe rather than what he knows to be true.

He says the industry came to him in the summer of 1933 begging for help. Let him be specific. He seeks to give the impression that the industry was then begging for the Federal handcuffs and legchains that the Thomas bill visioned by the Petroleum Administrative Board would rivet on the industry.

The record shows that the oil industry has consistently opposed Federal control, its case being best presented by the American Petroleum Institute through its counsel, Charles Evans Hughes, before the original Federal Oil Conservation Board in the hearings held in May, 1926.

There is a vast difference between the Federal co-operation the industry requested in 1933 and the status of a public utility with which Mr. Ickes threatens it with in 1935.

It has not been the industry which has changed but the administrator. In the summer of 1933 the industry was promised self-government. Today it is resisting Federal confiscation of the last semblance of industrial independence.

During the past two years it has observed with increasing dismay the steady destruction of its liberty and the distending jaws waiting to devour it.

Because the American Petroleum Institute, representing the industry, has had the courage to appeal to the people from this Chicago Caesar it is subjected to a farrago of abuse more familiar in slum politics than from a member of the cabinet of the United States.

Does refining pay?

Less than a year ago, a certain skimming plant refiner, and a good one, was out of luck

He was making a salable product but the by-product, which he could not sell, sucked all the profit out of his operation

Then his wisdom turned bad luck into good luck—he installed a Dubbs-cracking unit

Today his refinery is running to capacity, earning a profit of 57 cents a barrel on the crude (his own figure)

Are you making 57 cents a barrel on your operations?

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

Gasoline Market Shows Fresh Vigor in Group 3 With Other Oil Products in Brisk Demand

By T. F. SMILEY

Fresh strength appeared in the Group 3 gasoline market this week, with advancing tank car prices as concrete evidence of it. Contributing to the increased vigor was the new law in Texas permitting seizure of illegally produced oil and of products made from it. The measure is reported to have put an effective stop to the trucking of illicit gasoline from refineries in East Texas to consuming areas inside the State. Removal of this unlawful traffic immediately opened up additional business for the legitimate refiners, many of whom began loading trucks, thus tightening the tank car market. The resale price was 4½ cents for third-grade material, with likelihood of another eighth, as the week opened.

Inter-refinery buying was inactive. The small independent refiners throughout the Mid-Continent whose surplus stocks have been absorbed in the last two months by large integrated companies were scarcely heard from. Their offerings were few. Those who had material were said to be holding it in the belief they could get even better prices for it in a short time.

In Spite of Bad Weather

The motor fuel market's robust character was revealed in its aggressive behavior in the face of unfavorable motoring weather in many areas. Not only was there absence of distress stocks, but in some instances refiners were said to be somewhat pressed in filling orders. This tightening of the market was ascribed in part to the reduced importance of East Texas as a source of supply, following the more effectual clamp on hot-oil operations.

Jobber buying was at a low ebb, most of the movement being on contract. Observers point out in this connection that sharp contraction of the gasoline spot market in the last year has worked to the disadvantage of brokers, whose volume of business has dwindled so that some are considering abandonment of their offices.

During the era of demoralizing retail price wars last year many jobbers entered into contracts with major companies and thus withdrew from the spot market. Previously they had bought through brokers. Now they buy direct from the refiner.

Doubt Shadows Future

The brokers themselves assert their operations in the past not only have been a prime factor in creating an active market, but have exerted a stabilizing influence, a contention, by the way, in which they have the ungrudging support of many refinery sales managers. Doubt shadows their future.

While the business left for brokers has been cut to perhaps half its former volume, some of them declare they are voluntarily passing up business they might obtain. The reasons, they say, are chiefly two.

First, they say, most refiners are unwilling to give them as much time for ordering out material as these same refiners give a jobber. Thus, they point out, they would be likely to find themselves forced to give shipping instructions to the refiner before they themselves could get instructions from their own clients.

In the second place, they declare they are distrustful of the present market. They expressed this lack of faith when the rise in gasoline began two months ago and they have not changed their attitude, notwithstanding the preponderant view that the market is likely to advance farther and to maintain its vigor right up to the peak of the 1935 consuming season.

In addition there is the fact that some refiners augment their sales by doing a brokerage business, buying and selling material made by other refiners which under ordinary circumstances would be handled by regular brokers.

As things stand, brokers say, they are afraid to buy for requirements ahead, so they take such acceptable business as comes along from day to day and let it go at that, hoping coming months may disclose a brighter outlook.

Natural Gasoline Firm

Natural gasoline exhibited the same firmness that has characterized it for weeks. Prices in Oklahoma were unchanged, but the 26-70 grade in North Texas moved into a little higher ground as a result of inter-manufacturer buying.

Current demand is taking care of so large a part of the daily output that there is less movement to storage than might be expected, although substantial shipments from Texas plants are going to the Gulf. Ordinarily when natural gasoline's peak season arrives the current production at that period plus material stored earlier in the year takes care of all demands. But some of the larger manufacturers say there is less being stored at this juncture than they would like to see and they are looking ahead to the peak season with something like concern.

Most of the natural gasoline produced in Oklahoma is going to refineries inside the state, and there is almost no spot business.

Kerosene Up

Kerosene continued strong, with prices up. Jobbers protest against the current

(Continued on Page 48)

Refined Oil Market Barometer

Healthy tone pervading the gasoline market in all areas, with both tank car and retail prices moving upward, notwithstanding unfavorable motoring weather in much of the country. Outlook for the coming summer excellent. Although kerosene quotations dropped at eastern coastal points, they rose in the Mid-Continent and Gulf Coast regions in response to vigorous agricultural demand. Furnace oils still getting a play as a result of cold spring weather. Natural gasoline maintaining its firm undertone.

Mid-Continent—Gasoline and kerosene strong. Natural firm. Tractor fuels in demand.

East Coast—Gasoline market improved, with advances in tank car and pump prices predicted. Kerosene off.

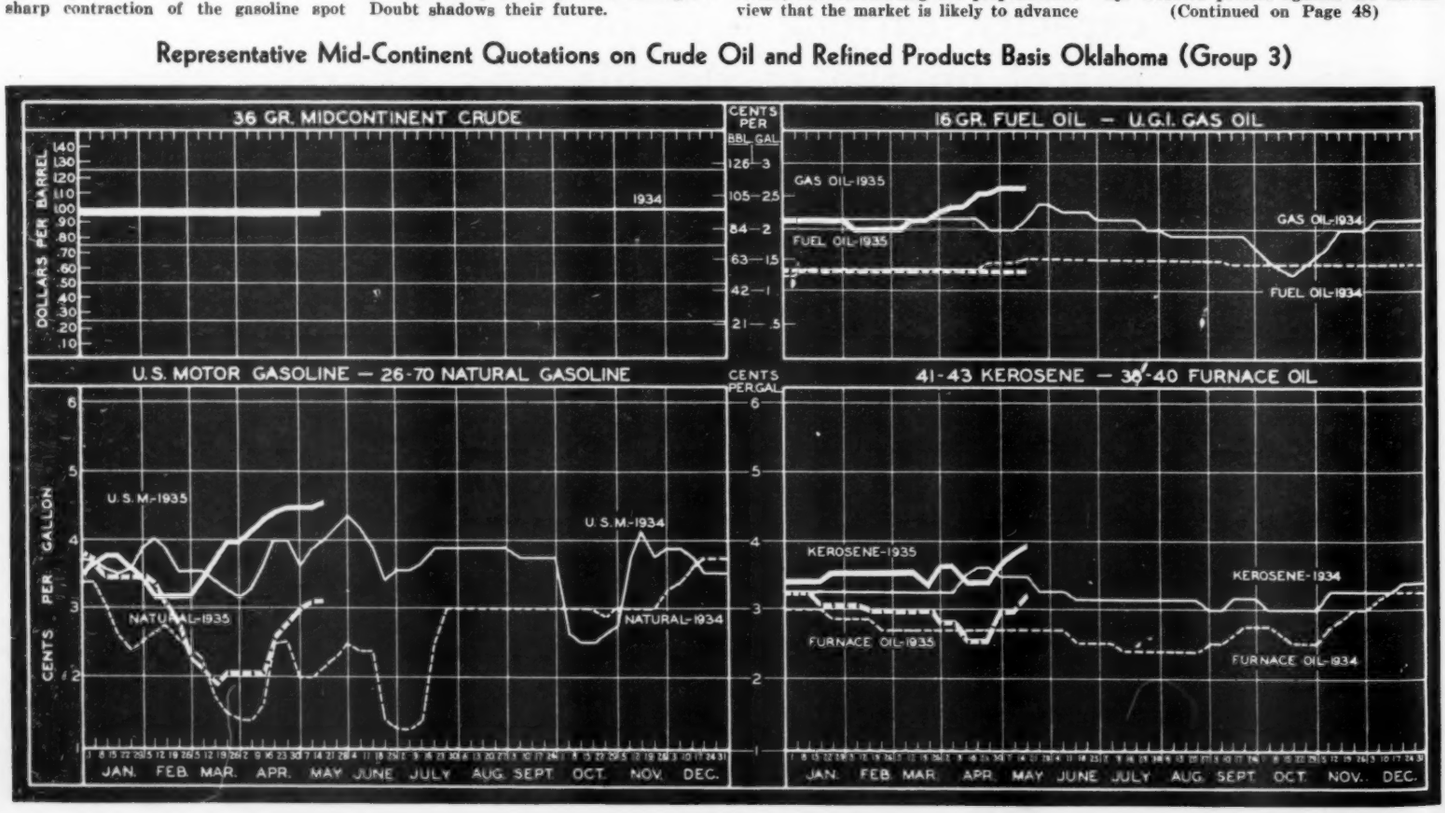
Gulf Coast—Gasoline, kerosene and distillates strong and scarce. Fuels firm. Lubricants holding, but sluggish.

Pennsylvania—General market steady, with prices firm, movement satisfactory and outlook bright.

California—Kerosene and naturals higher. General market firmer.

Chicago—Gasoline firm. Kerosene strong. Distillates unseasonably active.

Representative Mid-Continent Quotations on Crude Oil and Refined Products Basis Oklahoma (Group 3)



Increased Gasoline Demand on Atlantic Coast Aids in Making Trade Generally Optimistic

By C. O. WILLSON
New York Bureau, The Oil and Gas Journal

NEW YORK, May 13.—Price changes in refinery products in this territory over the past week included a one-fourth cent advance in base tank car prices in the Standard of New Jersey area, a one-fourth cent decrease in kerosene quotations at coastal points in New York State and New England, and the announcement of new tank wagon schedules on furnace oils for metropolitan New York. Except for these changes the refined market was generally quiet with the warmer weather of the past few days bringing a substantial increase in gasoline demand at service stations.

The Standard of New Jersey advance applying in its territory from Bayonne, N. J., to Charleston, S. C., May 10, met the increases which were made effective in New York State and New England on May 6. The new prices in the New York harbor area for tank car movement in both New York State and New Jersey are 5¾ cents for low octane, 6 cents for middle octane, 6¼ cents for 65 octane and above, and 6½ cents for ethylized branded grades of the major companies. Not all of the latter quote the low octane material. Some companies quote one-fourth cent less for barge deliveries. The Standard of New Jersey advance was accompanied by an increase of .3 cent in posted wagon and service station prices at most points in its territory.

Trade Generally Optimistic

As the week closed the trade generally was optimistic in regard to the domestic gasoline market. It was predicted by some that the next few days would see another general advance in gasoline tank car and station prices applying both to the Socony-Vacuum and Standard of New Jersey marketing territories. Others were inclined to predicate any further advances in this territory on developments at the Gulf Coast and were also urging caution in the efforts being made to place gasoline prices at profitable levels.

Gasoline tanker prices at the Gulf for coastwise movement appeared firm at levels which were established the latter part of April with 5¼ cents the prevailing quotation for 65 octane U. S. Motor. It is said there will be several tankers available there before the end of the month with the possibility of more material being offered should quotations be advanced to higher levels. Some of the sellers as well as buyers were of the opinion that it would be well to consolidate and definitely establish recent price gains at both the Gulf and Atlantic Seaboard points before attempting to move to still higher levels.

Kerosene Prices Lower

The reduction of one-fourth cent in kerosene tank car prices by Socony-Vacuum last week, making a price of 5 cents in metropolitan New York with one-eighth cent less for barge shipments, came somewhat as a surpise to the trade. The kerosene market in this territory has been weak since early in the year, but after a reduction of three-fourths cent from the top quotations, it was thought that prices would hold. There was additional fact that reports from the Mid-Continent and Middle West have indicated a heavy demand there which has reduced the amount of kerosene available at the Gulf. As will be explained later, however, the latest available figures do show a large increase in kerosene storage in this territory and there has been considerable underselling in both tank car and tank wagon markets, especially when any substantial quantity of business was available for immediate delivery.

New Furnace Oil Prices

The Socony-Vacuum company last week also announced a new schedule covering retail prices for furnace oils in the metropolitan New York area. They are 7¼ cents for No. 1; 6¼ cents for Nos. 2 and 3 and 5¾ cents for No. 4. The most interesting to many in the trade is the contract provision giving a top price differential of 1½ cents over these base prices. This differential over the season now closing has been 1 cent as required under the code.

The 1½-cent differential is interpreted to mean that refiners desire more protection than they have had in the past covering possible higher crude oil schedules and increases in other costs. It is agreed that the present base prices on furnace oils are exceptionally low when all factors are considered with the agitation in some quarters that base prices should be at least one-half cent higher on new contracts for the coming season. The results of possible currency inflation over the next year are said to be under consideration by sellers. This factor is also receiving consideration in the large bunker fuel contracts with the marine trade, many of which are made on flat basis covering periods of one or more years. Cancellation clauses as well as differentials above the base prices have been suggested as a means of protection for the sellers in any new agreements. It is understood that some of the largest distributors of furnace oils in this territory do not expect to decide finally on new contracts with jobbers and consumers until the end of the month. It is hoped at that time to work out an agreement which will be generally accepted. The new Socony-Vacuum prices are said to be based on a 2-cent margin between the delivered tank car and tank wagon prices. Based on metropolitan New York schedules the tank car prices would be 5¼ cents for No. 1, 4¼ cents for Nos. 2 and 3, and 3¾ cents for No. 4.

East Coast Operations

The following table summarizes the latest available data based on Bureau of Mines reports covering March operations with comparative data for March, 1934, and February, 1935 (data in thousands of barrels):

EAST COAST REFINERY OPERATIONS

	March, 1935	March, 1934	Feb., 1935
Output			
Crude runs to stills..	13,746	14,464	13,251
Gasoline	5,797	5,839	5,324
Kerosene	976	923	902
Gas oil and distillate	1,549	1,879	1,291
Residual fuel oils	3,665	4,057	3,308
Lubricants	596	586	641
Wax (lbs.)	17,360	22,120	15,680
Coke (tons)	14	13	11
Asphalt (tons)	65	55	51
Stocks End of Month			
Gasoline*	19,403	19,350	18,553
Kerosene	1,689	792	1,408
Gas oil and distillate.	3,176	1,613	2,880
Residual fuel oils	6,121	3,688	6,411
Lubricants	2,435	2,260	2,422
Wax (lbs.)	56,180	33,728	60,798
Coke (tons)	11	9	10
Asphalt (tons)	118	122	108
Road oils	21	38	30

*At refiners and bulk terminals.

These data show that the eastern refiners improved their gasoline situation in March by reducing their crude runs to stills 30,000 bbls. daily compared to February. Due to this reduction, gasoline stocks increased less than 1,000,000 bbls., and at the close of March were practically the same as March, 1934. It is contended by those in a position to know that gasoline inventories at eastern refineries are not excessive and have been increased over the past four months in line with a general stabilization program covering the entire country.

Supplies Exceeded Demand

The March situation in regard to several other products was not so favorable. In the case of kerosene, distillate and gas oil the supplies exceeded the demand and substantial additions were made to storage during the month. This situation developed despite the fact that March is a favorable month for consumption of these products and stocks are often reduced during that period. The fact that stocks of these products at the end of March were approximately 100 per cent greater than on the same date in 1934 explains the price weakness of the past several weeks in contrast to the strong market of a year ago.

Stocks of residual fuel oils are substantially greater than last year in this territory, but they were reduced in March and appear a stronger position than do the lighter fuels. Little change was shown in the data on lubricants except that production decreased in March. In contrast to the month to month increases over the past year, wax stocks were reduced in March.

Prices

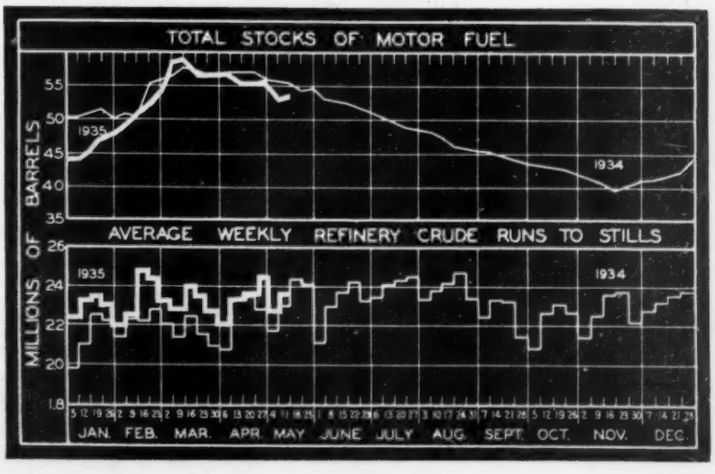
Prices on Pennsylvania and western stocks and neutrals in this territory are unchanged. With Pennsylvania bright selling as low as 21 cents in barrels for export and 600 steam refined 16½ cents, manufacturers are hopeful that any general improvement in refinery prices will include their steam refined and bright stock lists. There have been no further reductions in Pennsylvania neutrals, although the demand continues slow. There are more inquiries for wax in both domestic and foreign markets and prices are steady with all crude scale quotations 2 cents or higher.

Bunker fuel oil is unchanged at $1.15 per barrel to the marine trade and Marine Diesel is quoted at $1.89. The demand for both these products continues steady.

American Petroleum Institute Weekly Refinery Statistics

Week Ending May 11, 1935

	Capacity reporting per cent	Daily crude runs (bbls.)	Finished motor fuel (bbls.)	Gas oil and fuel oil (bbls.)
East Coast	100.0	428,000	16,437,000	8,838,000
Appalachian	94.8	98,000	2,101,000	686,000
Indiana, Illinois, Kentucky	95.9	385,000	9,429,000	4,225,000
Oklahoma, Kansas, Missouri	84.8	258,000	5,613,000	4,012,000
Inland Texas	48.5	105,000	1,354,000	1,805,000
Texas Gulf	96.4	489,000	6,458,000	9,006,000
Louisiana Gulf	96.4	101,000	1,205,000	3,206,000
North Louisiana and Arkansas	90.0	40,000	243,000	299,000
Rocky Mountain	61.9	44,000	1,020,000	791,000
California	92.6	423,000	10,020,000	63,558,000
Total United States	89.5	2,371,000	53,880,000	96,426,000



REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement except as otherwise noted

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasolines

	May 14		May 7	
OKLAHOMA (Group 3)—				
U. S. Motor grades:				
Below 63 octane	.04⅝	.04¾	.04½	.04⅝
63-70 octane	.05⅜	.05½	.05¼	.05⅜
60-62 400 grade:				
Below 63 octane	.04⅝	.04¾	.04½	.04⅝
63-70 octane	.05⅜	.05½	.05¼	.05⅜
64-66 375	.04¾	.04⅞	.04⅝	.04¾
68-70 360	.04⅞	.05	.04¾	.04⅞
NORTH TEXAS—				
U. S. Motor grades:				
Below 63 octane	.04⅝	.04¾	.04½	.04⅝
63-70 octane	.05⅜	.05½	.05¼	.05⅜
60-62 400	.04⅝	.04¾	.04½	.04⅝
64-66 375	.04¾	.04⅞	.04⅝	.04¾
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
U. S. Motor grades:				
Below 63 octane	.05¼		.05	
63-70 octane	.06		.05¾	
60-62 400	.05¼		.05	
ARKANSAS (Ark., N. La. & Miss. del.)—				
U. S. Motor grades:				
Below 63 octane	.05¼		.05	
63-70 octane	.06		.05¾	
CHICAGO (based on Oklahoma Group 3)—				
U. S. Motor grades:				
Below 63 octane	.04⅝	.04¾	.04½	.04¾
63-70 octane	.05⅜	.05½	.05¼	.05½
60-62 400	.04⅝	.04¾	.04½	.04¾
64-66 375	.04¾	.04⅞	.04⅝	.04¾
68-70 360	.04⅞	.05	.04¾	.04⅞
Aviation fighting grade	.05½	.05¾	.05½	.05¾
PENNSYLVANIA (inland refineries)—				
58-60 U. S. Motor:				
Below 60 octane	.05⅜	.05½	.05⅜	.05½
60-64.9	.06⅝	.06¾	.06⅝	.06¾
65-70 octane	.06⅞	.07	.06⅞	.07
68-70 350	.06½		.06¼	
CALIFORNIA (domestic movement)—				
54-58 U. S. Motor	.07	.08	.07	.08
58-60 400	.07¾	.08¾	.08	.09
EAST COAST—				
U. S. Motor, below 60 octane:				
*New York (Bayonne)	.05¾		.05¾	
Baltimore	.05¾		.05¾	
U. S. Motor, 60-64.9 octane:				
*New York (Bayonne)	.06		.06	
Philadelphia	.06	.06¼	.06	.06¼
Boston	.06		.06	
Baltimore	.06	.06¼	.06	.06¼
Charleston, S. C.	.06		.06	
U. S. Motor, 65 and above:				
*New York (Bayonne)	.06¼		.06¼	
Philadelphia	.06¼		.06¼	
Boston	.06¼		.06¼	
Baltimore	.06¼		.06¼	
Charleston, S. C.	.06¼		.06¼	

*All grades of gasoline one-fourth cent less for small barge shipments.

GULF COAST (domestic)—				
U. S. Motor:				
Below 60 octane	.05¼		.05¼	
60-64.9 octane	.05¼	.05½	.05¼	.05½
65 octane and higher	.05½		.05½	

Naphthas

	May 14		May 7	
PENNSYLVANIA (inland refineries)—				
50-52 (blending)	.04¼	.04⅜	.05¼	.05⅜
52-54 450 (blending)	.04¼	.04⅜	.05¼	.05⅜
54-56 450 (blending)	.04¼	.04⅜	.05¼	.05⅜
50-52 450 (blending)	.04¼	.04⅜	.05¼	.05⅜
CHICAGO (based on Oklahoma Group 3)—				
50-52 450 (blending)	.04⅝	.04¾	.04½	.04¾
Cleaners' naphtha, 56-58 gr., 200 i.b.p., 320 e.p.	.06¾	.07	.06¾	.07
Lacquer diluent, 180 i.b.p., 250 e.p.	.07¾	.08	.07¾	.08
Lacquer diluent, 140 i.b.p., 200 e.p.	.08¾	.09	.08¾	.09
Rubber solvent, 68-70 gr., 100 i.b.p., 300 e.p.	.06¾	.07	.06¾	.07
Stoddard solvent, 300 i.b.p., 410 e.p., over 83° flash	.06¼	.06½	.06¼	.06½
Pet. thinner, 290-300 i.b.p., 410 e.p., over 83° flash	.06¼	.06½	.06¼	.06½
V.M.&P. naphtha, 56-58 gr., 190-200 i.b.p., 330 e.p.	.06¾	.07	.06¾	.07
Petroleum spirits	.05¾	.06	.05¾	.06

Natural Gasolines

	May 14		May 7	
OKLAHOMA (Group 3)—				
Grade 26-70	.03½		.03⅛	
Grade 18-55	.03⅞	.04	.05⅞	.04
Low vapor pressure grades:				
14 lb. v.p. (max.)	.04¾	.04½	.04¾	.04½
12 lb. v.p. (max.)	.04¾		.04¾	
NORTH TEXAS—				
Grade 26-70	.03		.02¾	.03
Grade 18-55	.03¾	.03⅞	.03¾	.03⅞
Low vapor pressure grades:				
*14 lb. v.p. (max.)	.04¼	.04⅜	.04¼	.04⅜
*12 lb. v.p. (max.)	.04⅝		.04⅝	

*Nominal.

NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
Grade 26-70	.03¼		.03¼	
CALIFORNIA—				
75-85 375	.05½	.06¼	.05	.06

Kerosenes

(All kerosenes water white)

	May 14		May 7	
OKLAHOMA (Group 3)—				
41-43	.04	.04⅛	.03⅞	.04
42-44	.04⅛	.04¼	.04	.04⅛
NORTH TEXAS—				
40-41	.03¾	.03⅞	.03⅝	.03¾
41-43	.03⅞	.04	.03⅞	.04
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
41-43	.03¾	.03⅞	.03¾	.03⅞
ARKANSAS (Ark., N. La. & Miss. del.)—				
41-43	.03⅞		.03⅞	
PENNSYLVANIA (inland refineries)—				
45	.04¾		.04¾	
46	.04⅞		.04⅞	
47	.05		.05	
CHICAGO (based on Oklahoma Group 3)—				
41-43	.04	.04⅛	.04	.04⅛
42-44	.04¼	.04⅜	.04¼	.04¼
CALIFORNIA (Pacific Coast consumption)—				
38-40 high burning test	.04½	.05½	.04½	.05
NEW YORK (Bayonne, N. J.)—				
41-43	.05		.05	.05¼
GULF COAST (domestic)—				
41-43	.04¼	.04½	.04	.04¼

Petroleum Coke

(Prices per ton f.o.b. refineries in Chicago area)
(Refineries will absorb freight to 80 cents a ton)

	May 14	May 7
Pile run	5.75	5.75
Direct from still	6.75	6.75
Egg, nut, pea	8.00	8.00
Lump	8.00	8.00

Furnace Oils and Tractor Fuels

(Zero cold test under 190° flash and good odor)

	May 14		May 7	
OKLAHOMA (Group 3)—				
32-36 straw	.02⅝	.02¾	.02⅝	.02¾
36-38 straw	.02¾	.02⅞	.02¾	.02⅞
38-40 straw	.03¼	.03⅝	.03⅝	.03¼
38-40 prime white	.03⅜	.03½	.03¼	.03⅜
NORTH TEXAS—				
38-40 straw	.03¼	.03⅜	.03⅛	.03¼
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
36-40 furnace oil	.02¾	.02⅞	.02¾	.02⅞
ARKANSAS (Ark., N. La. & Miss. del.)—				
32-36 furnace oil	.02¾	.02⅞	.02¾	.02⅞
CHICAGO (based on Oklahoma Group 3)—				
32-36 straw	.03	.03⅛	.03	.03⅛
38-40 straw	.03⅜	.03½	.03¼	.03⅜
38-40 prime white	.03½	.03⅝	.03⅜	.03½
NEW YORK (Bayonne, N. J.)—				
No. 1	.05		.05	.05¼
No. 2	.04	.04¼	.04	.04¼
No. 4	.04		.04	.04¼

Gas Oil, Diesel Oil and Fuel Oil

(Gas oil per gal., Diesel and fuel oils per bbl.)

	May 14		May 7	
OKLAHOMA (Group 3)—				
32-36 gas oil, cracking stock	.02⅝	.02¾	.02⅝	.02¾
U.G.I. gas oil	.02⅝	.02¾	.02⅝	.02¾
32-36, zero to 15 gas oil	.02⅝	.02¾	.02⅝	.02¾
28-30, No. 3 burner oil	1.02½	1.07½	1.02½	1.07½
26-30, zero to 10 fuel oil	.92½	.97½	.92½	.97½
24-26 fuel oil	.75	.77½	.75	.77½
20-22 fuel oil	.70	.75	.70	.75
Below 16 fuel oil	.60	.62½	.60	.62½
NORTH TEXAS—				
32-36 gas oil, industrial	.02½	.02⅝	.02½	.02⅝
22-26 fuel oil	.65	.67½	.65	.67½
Below 20 fuel oil	.60	.62½	.60	.62½
NORTH LOUISIANA (Ark., N. La. & Miss. del.)—				
30-32 gas oil, zero	.02¾	.02⅞	.02¾	.02⅞
14-16 fuel oil	.70	.75	.70	.75
ARKANSAS (Ark., N. La. & Miss. del.)—				
30-32 gas oil, zero	.02¾	.02⅞	.02¾	.02⅞
32-36 gas oil	.02¾	.02⅞	.02¾	.02⅞
14-16 fuel oil	.65	.70	.65	.70
CHICAGO (based on Oklahoma Group 3)—				
32-36 gas oil, industrial	.02½	.02⅝	.02½	.02⅝
28-30 zero to 10, fuel oil	1.02½	1.07½	1.05	1.10
26-28 zero to 10, fuel oil	.92½	.97½	.95	1.00
22-26 zero to 10, fuel oil	.82½	.85	.82½	.87½
18-22 zero to 10, fuel oil	.65	.70	.67½	.70
Below 18 fuel oil	.57½	.60	.57½	.60

Note: Fuel oils of more than 40 cold test generally 5 to 15 cents per barrel in all these areas.

PENNSYLVANIA (inland refineries)—				
30-40	.04		.04	
CALIFORNIA—				
Los Angeles:				
30-34 gas oil, per bbl.	1.15	1.25	1.15	1.25
27 plus Diesel	1.15	1.25	1.15	1.25
27 plus Diesel (bunkers)	1.25	1.30	1.25	1.30
12-16 (bunkers at tidewater)	.85	.95	.85	.95
10-16 (cargo lots)	.75	.85	.75	.80
12-17 (tank cars)	.65	.85	.65	.85
San Joaquin Valley:				
10-18 (tank cars)	.60	.75	.60	.75
San Francisco:				
27 plus Diesel, per bbl.	1.25		1.25	
27 plus Diesel (bunkers)	1.35		1.35	
10-16 (bunkers)	1.00		1.00	
GULF COAST—				
28-30 gas oil	.03½	.03⅝	.03½	.03⅝
28-30 Diesel (bunkers)	1.70		1.70	
Bunker C (bulk cargoes)	.85	.90	.85	.90
Bunker C (bunkers)	.95	1.00	.95	1.00
NEW YORK (Bayonne, N. J.)—				
27 plus, gas oil	.04	.04¼	.04	.04¼
28-30 Diesel (lighterage 6½ cents per bbl.)	1.89		1.89	
*Bunker C (to ocean-going ships in N. Y. harbor)	1.15		1.15	
Industrial fuel (tank cars)	.03¾	.04	.03¾	.04

*Lighterage charge 5 cents per barrel additional.

Neutral Oils

(Vis. at 100° F. except Pennsylvania, and color N.P.A.)

	May 14		May 7	
OKLAHOMA (Group 3)—				
Zero to 10 Cold Test:				
150-3	.10		.10	
180-3	.11¼		.11¼	
180-4	.10¾		.10¾	
200-3	.11¾		.11¾	
200-4	.11¼		.11¼	
240-3	.13¾		.13¾	
240-4	.13¼		.13¼	
280-3	.14¾		.14¾	
280-4	.14		.14	
300-3½	.15¼		.15¼	
400-4	.17¼		.17¼	
100-2 paraffin oil	.05¾		.05¾	
15-20 Cold Test:				
200-3	.10¾		.10¾	
200-4	.10¼		.10¼	
240-3	.12¾		.12¾	
240-4	.12¼		.12¼	
280-3	.13¾		.13¾	
280-4	.13		.13	
GULF COAST—				
Pale Oils:				
200-3	.07	.07½	.07	.07½
300-3	.07½	.08	.07½	.08
500-3½	.08½	.09	.08½	.09
750-3½	.09	.09¼	.09	.09¼
1,200-3½	.09½	.09¾	.09½	.09¾
2,000-4	.09¾	.10	.09¾	.10
Red Oil:				
200-5-6	.07	.07¼	.07	.07¼
300-5-6	.07¼	.07½	.07¼	.07½
500-5-6	.08	.08¼	.08	.08½
750	.08½	.09	.08½	.09
1,200-5-6	.09¼	.09½	.09¼	.09½
CALIFORNIA (moving to domestic market)—				
Pale Oils:				
100-2½-3	.07½	.07¾	.07½	.07¾
200-2½-3	.08	.08¼	.08	.08¼
300-3-3½	.09	.10	.09	.10
350-3-4	.10½	.11	.10½	.11
400-3-4	.12	.12½	.12	.12½
450-3-4	.12½	.12¾	.12½	.12¾
550-3-4	.13	.13½	.13	.13½
600-3-4	.13½	.14	.13½	.14
Red Oils:				
200-4-5	.08½	.09	.08½	.09
300-5-6	.09		.09	
350-5-6	.10	.10¼	.10	.10¼

400-5-6	.10½	.10¾	.10½	.10¾
450-5-6	11	.11¼	.11	.11¼
500-5-6	.11½	.11¾	.11½	.11¾
600-5-6½	.12	.12¾	.12	.12¾
700-6½ plus	.13	.13¼	.13	.13¼
750-6½ plus	.13½	.13¾	.13½	.13¾
900-6½ plus	.14	.14½	.14	.14½
PENNSYLVANIA—				
150 vis. at 70° F., 3 color, 400-405 flash:				
Zero pour test	.20½	.21	.20½	.21
10 pour test	.19½	.20	.19½	.20
15 pour test	.19	.19½	.19	.19½
25 pour test	.18	.18½	.18	.18½
180 vis. at 70° F., 3 color:				
25 pour test	.21	.21½	.21	.21½
200 vis. at 70° F., 3 color:				
Zero pour test	.25½	.26	.25½	.26
10 pour test	.24½	.25	.24½	.25
15 pour test	.24	.24½	.24	.24½
25 pour test	.23	.23½	.23	.23½

Bright and Steam Refined Stocks

OKLAHOMA (Group 3)—	May 14		May 7	
Bright Stocks:				
190-200 D	.17		.17	
150-160 D, 0-10	.14		.14	
150-160 D, 10-25	.13½		.13½	
150-160 25-40	.13		.13	
150-160 E	.13		.13	
Steam refined:				
630 light green (treated)	.07½	.08	.07½	.08
600 light green (untreated)	.06	.08	.06	.08
600 dark green (untreated)	.04½	.07	.04½	.07
PENNSYLVANIA—				
Bright Stocks (Pennsylvania grade, No. 8 color, 145-50 at 510; 540-550 flash):				
10 pour test	.19	.19½	.19	.19½
15 pour test	.18	.18½	.18	.18½
20 pour test	.17	.17½	.17	.17½
25 pour test	.16	.16½	.16	.16½
Steam refined:				
600	.07½	.08	.07½	.08
650	.10	.10½	.10	.10½
600 Pennsylvania flash	.11	.11½	.11	.11½
630 flash	.16	.16½	.16	.16½
600 Warren E filtered	.12	.12½	.12	.12½

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—	May 14		May 7	
124-126 white crude scale	.02	.02¼	.02	.02¼
PENNSYLVANIA (inland refineries)—				
122-124	.0210	.0215	.0210	.0215
124-126	.0215	.0220	.0215	.0220
NEW YORK—				
Wax (a.m.p.) in bags fully refined:				
Refined grades:				
123-125	.0380		.0380	
125-127	.0400		.0400	
128-130	.0425		.0425	
130-132	.0440		.0440	
133-135	.0500		.0500	
135-137	.0525		.0525	
Crude scale:				
124-126 w.s.	.0200	.0225	.0200	.0225
124-126 y.s.	.02	.0215	.02	.0215
Petroleum in barrels in carload lots:				
Dark green	.01⅞		.01⅞	
Amber	.02⅞	.03	.02⅞	.03
Extra amber	.03	.03⅛	.03	.03⅛
Lily white	.06⅝	.06¾	.06⅝	.06¾
Snow white	.07¾	.07⅞	.07¾	.07⅞
Cream	.05⅝	.05¾	.05⅝	.05¾
CHICAGO (f.o.b. switching district)*—				
122-124 wax	.0440	.0450	.0440	.0450
125-127 wax	.0465	.0475	.0465	.0475
127-129 wax	.0480	.0490	.0480	.0490
130-132 wax	.0540	.0550	.0540	.0550
132-134 wax	.0565	.0575	.0565	.0575

*Cents per pound on carload lots in burlap bags of 225 lbs. approx. Add 3° a.m.p.

Export Prices

GASOLINE

GULF COAST—	May 14		May 7	
U. S. Motor	.04½	.04⅝	.04½	.04⅝
60-62 400	.04⅝	.04¾	.04⅝	.04¾
61-63 390	.04⅞		.04⅞	
64-66 375	.05		.05	
LOS ANGELES:				
U. S. Motor grades:				
53-55 octane	.04		.04	
55-65 octane	.04	.04¼	.04	.04¼
65-67 octane	.04¼	.04½	.04¼	.04½
67-69 octane	.04½	.04¾	.04½	.04¾
Above 69 octane	.04¾	.05	.04¾	.05
58-60 400 endpoint	.04½	.05	.04½	.05
KEROSENE				
GULF COAST—				
41-43 prime white	.03⅞	.04	.03⅞	.04
41-43 water white	.04	.04¼	.04	.04¼
44 water white	.04¼		.04¼	
LOS ANGELES:				
41-43 water white	.04½	.05	.04½	.05
LUBRICANTS				
NEW YORK (f.a.s. in bbls.)—				
Cylinder Stocks:				
600 Warren E	.18½	.19	.18½	.19
600 S.R. unfiltered	.14	.14½	.14	.14½
650 S.R. unfiltered	.15½	.16	.15½	.16
600 flash S.R.	.16½	.17	.16½	.17
630 flash S.R.	.20½	.21	.20½	.21
Bright Stocks:				
8 color	.21	.22	.21	.22
6½ plus colors in dilution	.20	.21	.20	.21
NEUTRAL OILS				
200-3 color	.28		.28	
150-3 color	.23		.23	
PARAFFIN WAX (Fully Refined)				
NEW YORK (prices per pound):				
123-125 a.m.p.	.03625		.03625	
125-127 a.m.p.	.0375		.0375	
128-130 a.m.p.	.0400		.0400	
130-132 a.m.p.	.0425	.0450	.0425	.0450
133-135 a.m.p.	.0475		.0475	
135-137 a.m.p.	.05		.05	
Crude scale:				
124-126 w.s.	.0200	.0215	.0200	.0215
124-126 y.s.	.02	.0205	.02	.0205

Crude Oil Gravity Table

Gravity—	Oklahoma and Kansas 1	North Texas, Central Texas and East Central Texas 2	North Louisiana and Arkansas 3	Gray County, Texas 4	Carson, Hutchinson and Moore Counties, Texas 5	Conroe, Texas 6	Salt Creek, Wyo. 7	Gulf Coast, Texas and Louisiana 8	Gulf Coast, Texas and Louisiana 9	Cotton Valley, Louisiana 10
Below 20	....	....	....	....	....	....	....	$ .82	$ .82	....
20-20.9	....	....	....	....	....	....	....	.84	.84	....
21-21.9	....	....	....	....	....	....	....	.86	.86	....
22-22.9	....	....	....	....	....	....	....	.88	.88	....
23-23.9	....	....	....	....	....	....	....	.90	.90	....
24-24.9	....	....	....	....	....	....	....	.92	.92	....
Below 25	$ .76	....	....	....	....	....	....	....	....	$ .70
25-25.9	.78	....	....	....	....	....	....	.94	.94	.72
26-26.9	.80	....	....	....	....	....	....	.96	.96	.74
27-27.9	.82	....	....	....	....	....	....	.98	.98	.76
28-28.9	.84	....	....	....	....	....	....	1.00	1.00	.78
Below 29	.84	$ .79	$ .79	....	....	....	$ .84	....	....	....
29-29.9	.86	.81	.81	....	....	....	.86	1.02	1.02	.80
30-30.9	.88	.83	.83	....	....	....	.88	1.04	1.04	.82
31-31.9	.90	.85	.85	....	....	....	.90	1.06	1.05	.84
32-32.9	.92	.87	.87	....	....	....	.92	1.08	1.06	.86
33-33.9	.94	.89	.89	....	....	....	.94	1.10	1.07	.88
34-34.9	.96	.91	.91	....	....	....	.96	1.12	1.08	.90
Below 35	....	....	....	$ .79	$ .69	....	....	....	....	....
35-35.9	.98	.93	.93	.81	.71	$1.09	.98	1.12	1.09	.92
36-36.9	1.00	.95	.95	.83	.73	1.11	1.00	1.12	1.10	.94
37-37.9	1.02	.97	.97	.85	.75	1.13	1.02	1.12	1.11	.96
38-38.9	1.04	.99	.99	.87	.77	1.15	1.04	1.12	1.12	.98
39-39.9	1.06	1.01	1.01	.89	.79	1.17	1.06	1.12	1.13	1.00
40 and over	1.08	1.03	1.03	.91	.81	1.19	1.08	1.12	1.14	1.02

Effective December 3, 1934, Panhandle Refining Co., purchasing oil in North Texas, posted below 29 degrees, 68 cents; 29-29.9 degrees, 70 cents, with 2 cents added for each additional degree up to 40 and over, at 92 cents.

*The following companies purchasing crude oil in Kansas or Oklahoma, or both, begin their price schedule: Below 25°, 76 cents; 25-25.9°, 78 cents, with 2 cents added for each degree upward to 40 and over at $1.08; Carter Oil Co., Magnolia Petroleum Co., Pure Oil Co., Rock Island Refining Co., Shell Petroleum Corp., Sinclair Prairie Oil Marketing Co., Skelly Oil Co., and Wilcox Oil & Gas Co. All others begin their schedules at below 29°, 84 cents, excepting Philtex Oil Co., which begins with below 31° at 88 cents.

Column 1—Effective September 29, 1933, Texas Co. of Oklahoma; Stanolind Crude Oil Purchasing Co. in Kansas and Oklahoma; Anderson & Prichard, Inc., in Oklahoma; Bell Oil & Gas Co. in Oklahoma; Carter Oil Co. in Oklahoma and Kansas; Deep Rock Oil Co. in Oklahoma; Derby Oil Co. in Kansas; Globe Refining Co. in Oklahoma; Golden Rule Refining Co. in Kansas; Gypsy Oil Co. in Oklahoma and Kansas; Kanotex Refining Co. in Kansas; Magnolia Petroleum Co. in Oklahoma; Mid-Continent Petroleum Corp. in Oklahoma; National Refining Co. in Kansas and Oklahoma; Shell Petroleum Corp. in Kansas and Oklahoma; Sinclair Prairie Oil Marketing Co. in Kansas and Oklahoma; Texas Co. in Oklahoma; Tide Water Oil Co. in Oklahoma; Vickers Refining Co. in Kansas; Continental Oil Co. in Kansas and Oklahoma; Empire Pipe Line Co. in Oklahoma and Kansas; Philtex Oil Co. in Kansas and Oklahoma; Pure Oil Co. in Oklahoma; Skelly Oil Co. in Kansas. Effective September 29, by White Eagle Oil Corp. in Kansas; October 1, by Barnsdall Refineries, Inc., in Oklahoma.

Column 2—Effective September 29, 1933, by Texas Co., Stanolind Crude Oil Purchasing Co., Humble Oil & Refining Co., Sinclair Prairie Oil Marketing Co., Gulf Pipe Line Co., Magnolia Petroleum Co., Bell Oil & Gas Co., Continental Oil Co. Effective January 14, 1935, in the Van Pool, Van Zandt County, Pure Oil Co. posted below 29°, 79 cents with 2 cents added for each degree up to 40 and over at $1.03.

Column 3—Effective September 29, 1933, by Texas Co., Magnolia Petroleum Co., Gulf Refining Co. Effective December 22, Stanolind Oil & Gas Co. in Pine Island, Louisiana, and Marion County, Texas, posted below 29°, 79 cents, with 2 cents added for each degree up to 40 and over at $1.03. Effective March 17, 1934, by Standard Oil Co. of Louisiana and Louisiana Oil Refining Co. Starting with below 25°, 71 cents, adding 2 cents for each degree upward to 40 and over at $1.03.

Column 4—Effective September 29, 1933, by Texas Co., Humble Oil & Refining Co., Magnolia Petroleum Co., Sinclair Prairie Oil Marketing Co., and H. F. Wilcox Oil & Gas Co. On same day, Philtex Oil Co. posted below 31°, 71 cents, with 2 cents added for each degree up to 40 and over at 91 cents. Effective June 1, 1934, Texas Co. (see note above).

Column 5—Effective September 29, 1933, by Texas Co., Humble Oil & Refining Co., Gulf Pipe Line Co., Magnolia Petroleum Co., Wilcox Oil & Gas Co., Continental Oil Co. On same day, Philtex Oil Co. posted below 31°, 61 cents, with 2 cents added for each degree upward to 40 and over at 81 cents. Effective June 1, 1934, Texas Co. (see note above).

Column 6—Effective September 29, 1933, by Humble Oil & Refining Co. and Tide Water Oil Co., and on September 30 by Texas Co., which on September 29 had posted a schedule of $1.07 to $1.12 with a 1-cent spread on each degree.

Column 7—Effective September 29, 1933, by Stanolind Oil & Gas Co.

Column 8—Effective September 29, 1933, by Humble Oil & Refining Co., Gulf Pipe Line Co., Shell Petroleum Corp., Pure Oil Co., Sinclair Prairie Oil Marketing Co. On October 2, Magnolia Petroleum Co. posted Lockport, Louisiana, 20-20.9°, 84 cents, with 2 cents added for each degree upward to 34 and over at $1.12; and in Cameron Meadows and Iowa, Louisiana, below 20°, 72 cents, with 2 cents added for each degree up to 34 and over at $1.02. These prices were 2 cents higher on each degree than Magnolia prices posted on September 29. Effective September 29, Shell Petroleum Corp. posted in Iowa, Louisiana, district: Below 20°, 70 cents, with 2 cents added for each degree upward to 34° and over at $1; and in Black Bayou and White Castle, Louisiana, Below 20°, 80 cents, with 2 cents added for each degree upward to 34° and over at $1.10.

Column 9—Effective September 30, 1933, Texas Co. (On September 29 Texas Co. has posted a schedule of 2 cents on each degree, but changed it on September 30.)

Column 10—Effective September 29, 1933, by Louisiana Oil Refining Co.

(California Crude Oil Prices on Page 47)

Crude Oil Prices

Oklahoma, Kansas, North Central and East Central Texas

East Texas	$1.00
Corsicana (heavy) (June 17, 1933)*	.80
Other fields	(See gravity table)

Note—In East Texas, effective September 29, 1933, by Texas Co., Stanolind Crude Oil Purchasing Co., Humble Oil & Refining Co. Shell Petroleum Corp., Gulf Pipe Line Co Tide Water Oil Co., Sinclair Prairie Oil Marketing Co., Magnolia Petroleum Co., Sun Oil Co., Panola Pipe Line Co., Empire Oil & Refining Co., and Atlas Pipe Line Co posted 60 cents per barrel in East Texas but on November 3 resumed its posted price of $1 per barrel, making it retroactive to October 22.

*Magnolia Petroleum Co.

West Texas

Crane, Upton, Crockett, Howard, Glasscock, Mitchell (Sept. 29, 1933)	$ .70
Ector, Winkler and Pecos Counties and Lea County, New Mexico (Sept. 29, 1933)	.70
Pecos County, Yates shallow Pool (Sept 29, 1933)*	.85
Jones and Fisher Counties*.	See gravity table

Note—Effective September 29, 1933, by Humble Oil & Refining Co., Texas Co., Gulf Pipe Line Co., Shell Petroleum Corp., Magnolia Petroleum Co., and by Stanolind Oil & Gas Co. in Winkler County, Texas.

*Shell Petroleum Corp.

Gulf Coast

Grade A and Grade B specifications discontinued by leading buyers.

	(See gravity table)
Tomball (see note)*	$1.11
Livingston (Sept. 29, 1933)†	1.00
Cleveland (Jan. 11, 1934)	1.00
Greta (Sept. 29, 1933)	.85
Refugio, light	(See gravity table)
Refugio, heavy (Sept. 29, 1933)‡	.85
Markham and High Island	(See Gulf Coast gravity table)
Conroe	(See Conroe gravity table)
Bosco, La. (Jan. 18, 1935)§	$.90

Note—Tomball, effective September 29, by Humble Oil & Refining Co. and October 3 by Magnolia Petroleum Co., and November 10 by Stanolind Crude Oil Purchasing Co.

*Greta posted by Texas Co. †Shell Petroleum Corp. ‡Refugio heavy by Humble Oil & Refining Co. Cleveland (Liberty County) posted by Magnolia Petroleum Co. §Bosco posted by Pure Oil Co.

South Central and Southwest Texas

(See note below table)

Darst Creek	$.87
Mirando	.80
Luling (Sept. 29, 1933)	.75
Pettus	1.05
Salt Flat	.87
Lytton Springs (Sept. 29, 1933)	.95
Duval County (Sept. 29, 1933)	.80
Saxet	.85

Note—Effective on September 29 by Humble Oil & Refining Co. in Darst Creek, Mirando, Pettus, Salt Flat and Saxet. Effective September 29 in Darst Creek by Gulf Pipe Line Co. and Texas Co. Effective October 2 by Magnolia Petroleum Co. Effective in Pettus and Salt Flat on September 29 by Humble Oil & Refining Co. and Gulf Pipe Line Co. Luling and Lytton Springs by Magnolia Petroleum Co. Duval County by Texas Co. Saxet, effective September 29 by

(Continued on Page 47)

TANK WAGON MARKETS

Quotations for gasoline and kerosene in United States, as furnished by the larger marketing concerns, include taxes

May 14, 1935

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline quoted is the regular or standard grade. In most marketing areas a third grade and a premium grade are also available.

Discounts

Under the standard form of commercial consumer contract which went into effect March 1, 1934, save in California, Oregon, Washington, Arizona and Nevada, a discount of 1 cent a gallon off tank wagon or 3 cents a gallon off retail prices is permitted for purchases running between 4,000 and 10,000 gallons a month, or 4 cents a gallon off retail prices for purchase in lots of more than 10,000 gallons a month. The minimum delivery is 25 gallons.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Denver, Colo.	18.0	20.0	5.0	11.0
Pueblo	17 0	19 0	5 0	13 0
Grand Junction	20 5	22 5	5.0	15.0
Casper, Wyo.	18 5	20.5	5.0	11 5
Cheyenne	18 5	20.5	5 0	13.0
Butte, Mont.	21 0	23 0	5 0	17 5
Billings	22.0	24 0	6.0	16 5
Helena	23 0	25.0	6.0	17.5
Great Falls	19.5	21.5	6.0	17.5
Salt Lake, Utah	21 0	23 0	5 0	16 0
Boise, Idaho	22.5	24 5	6.0	18.0
Twin Falls	22.5	24.5	6 0	18 0
Albu'que, N. M.	20 0	22.0	*6.5	13 0

*One-half cent city tax.

Effective March 1, 1934, discount to dealers with or without contract throughout Continental territory: Undivided dealer discount off service station price, 4 cents; divided dealer accounts, 3½ cents.

Standard Oil Co. (Indiana)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Chicago	15 2	17 2	4 0	9 8
Decatur, Ill.	15 2	17 2	4.0	9.8
E. St. Louis	14.8	16.8	4.0	9 4
Joliet	15 2	17 2	4 0	9 8
Peoria	15 2	17.2	4.0	9 8
Quincy	15 0	17 0	4 0	9.6
Davenport, Ia.	15.2	17 2	4 0	9 8
Des Moines	15.0	17 0	4.0	9 6
Mason City	15.4	17 4	4.0	10 0
Sioux City	15 2	17 2	4 0	9.8
Duluth, Minn.	16.0	18.0	4 0	10.6
Mankato	15 6	17.6	4 0	10 2
Minneapolis	15 6	17.6	4.0	10 2
LaCrosse, Wis.	16 6	18 6	5.0	10 2
Green Bay	16.9	18.9	5 0	10 5
Milwaukee	16 5	18.5	5 0	10 1
Madison	16.6	18.6	5 0	10.2
Detroit, Mich.	16.7	18 7	4 0	9 4
Grand Rapids	16.6	18.6	4 0	9 3
Saginaw	16.8	18 8	4.0	9 3
Evansville, Ind.	16.9	18 9	5 0	10 3
Indianapolis	17 1	19 1	5 0	10.5
South Bend	17 3	19 3	5 0	10.7
Fargo, N. Dak.	16 6	18.6	4 0	11 2
Huron, S. Dak.	17 1	19.1	5.0	10.7
Sioux Falls	16 6	18 6	5.0	9.3
Kans. Ci., Mo.*	14 6	16 6	4.0	9 2
Springfield	14 3	16.3	4 0	8.9
St. Louis	14 9	16.9	3.5	9 5
St. Joseph*	14 6	16 6	4.0	9 2
Wichita, Kans.	14 1	13 9	4.0	6 3
Bartlesville, Ok.	16.0	18 0	5 0	8.8

*State tax 2 cents, 1-cent city tax and 1-cent federal tax.

Discounts to dealers: Undivided accounts 1⅛ cents on premium and regular and 2½ cents on third grade off service station prices; divided accounts one-half cent less than undivided. Where prices are more than 1 cent below normal, the discounts are one-half cent less than above.

Stanolax Furnace Oil in Chicago

Effective Feb. 16, 1935, f.o.b. Chicago tank wagon prices: Range oil, less than 80 gallons, 3½ cents; 80-149 gallons, 7½ cents; 150 gallons and more, 7 cents. No. 1 (36-40 lt. stw. zero), less than 100 gallons, 3½ cents; 100-149 gallons, 7½ cents; 150 gallons or more, 7 cents; No. 2 (30-34, stw. zero), less than 150 gallons, 8 cents; No. 3 (32-36, zero), less than 150 gallons, 7 cents; No. 4 (12-16 zero), less than 400 gallons, 7 cents; viscosity of No. 4, 85 and 100° F.; No. 5, less than 400 gallons, 5¾ cents. For deliveries of more than stated quantities of Nos. 2, 3, 4 and 5, deduct 1 cent.

(Note: Range oil not quoted by Standard; quotation on this product by Burning Oil Distributors Association.)

Southern District

STANDARD OIL CO. (KENTUCKY)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Atlanta, Ga.	18 0	20 0	7.0	12.0
Augusta	19.5	21.0	7.0	13.0
Macon	20.0	22.0	7.0	13.0
Savannah	18 5	20.5	7.0	14 0
Birm'ham, Ala.	21 0	23.0	8.0	10.0
Mobile	20.0	22.0	8.0	11.0
Montgomery	22 0	24 0	8 0	15.5
Jackson, Miss.	19 0	21 0	7.0	11 0
Vicksburg	19 0	21.0	7.0	14.5
Jack'ville, Fla.	18.5	20 5	8.0	11 5
Miami	18 5	20 5	8.0	13.5
Pensacola	20 0	22 0	8.0	11.5
Tampa	18.5	20 5	8 0	12 5
Lexington, Ky.	19.0	21 0	6 0	12 5
Covington	17.5	19.0	6 0	12.5
Louisville	18 0	20 0	6 0	10.0
Paducah	18 0	20 0	6 0	8.0

In addition to the state tax of 4 cents on gasoline, Montgomery has city and county tax of 2 cents on gasoline and one-half cent on kerosene. Kerosene prices in Georgia and Mississippi include 1 cent state tax; in Alabama, an inspection fee of one-half cent on kerosene and one-fortieth cent on gasoline; in Florida an inspection fee of one-eighth cent on kerosene and gasoline. To Pensacola, Mobile and Birmingham state taxes on gasoline add 1 cent city tax.

Southwestern District

MAGNOLIA PETROLEUM CO.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Dallas, Tex.	15 0	17.0	5.0	8.0
Fort Worth	14.0	16 0	5.0	7.0
Houston	15 0	17 0	5.0	8.0
San Antonio	15.0	17.0	6.0	8.0
El Paso	17.0	19.0	5.0	10.0
Muskogee, Ok.	16.0	18.0	5.0	8.0
Okla. City	16.0	18.0	5 0	8 0
Tulsa	16.0	18.0	5 0	8 0
Ft. Smith, Ark.	14.5	18.0	5.0	8.0
Little Rock	17.0	20.5	7.5	8.0
Texarkana	15.5	17.5	5.0	7 0

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Atl'tic City, N.J.	14.0	17 5	4.0	9.0
Newark	13.3	16 8	4.0	7.5
Annapolis, Md.	14.5	18.1	5.0	10.0
Baltimore	14.1	17.6	5.0	8.5
Cumberland	15 8	19 1	5.0	12.7
Wash'g'n, D. C.	12 3	15 8	3 0	9.5
Danville, Va.	16.6	20.1	6 0	12.9
Norfolk	15.1	18 6	6.0	11.3
Petersburg	15 8	19 3	6.0	11.4
Richmond	15 8	19 3	6.0	11.7
Roanoke	16 8	20.3	6.0	12.9
Charles'n, W.Va.	15.0	18 5	5.0	12.6
Parkersburg	14 3	17.8	5 0	11.2
Wheeling	15.0	18 5	5.0	12.2
Charlotte, N. C.	18.4	21.9	7.0	13.5
Hickory	18.7	22 2	7 0	13.7
Mt. Airy	18 7	22.2	7 0	13.8
Raleigh	18.2	21 7	7 0	13.3
Salisbury	16 3	18 3	7.0	13 6
Charleston, S.C.	16.2	19 7	7.0	11.3
Columbia	18 0	21.5	7 0	13.2
Spartanburg	17 05	19.3	7 0	13.5

Effective October 23, tank wagon gasoline refers to dealer instead of retail prices.

Price basis to dealers: Undivided dealers at regular price less one-half cent. Discount for kerosene, 1 cent off tank wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except in New Jersey, where no discount is given.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Omaha	17 6	19.6	6 0	10 1
McCook	18 3	20 3	6 0	10.8
Norfolk	18 0	20.0	6.0	10.5
North Platte	18 4	20 4	6 0	10.1
Scottsbluff	19 1	21.1	6.0	11 6

Note: Discounts to dealers; where service station gasoline prices are (maximum overall, including rent) as follows: Reliance, 2½ cents; Standard Red Crown, 3½ cents; Red Crown Ethyl, 3½ cents.

Where service station gasoline prices are below normal, resellers' allowances are reduced one-half of the amount below normal, down to the following (minimum overall, including rent): Reliance, 2 cents; Standard Red Crown, 3 cents; Red Crown Ethyl, 3 cents. Discounts to consumers for tank wagon deliveries covered only by Standard Commercial Consumers Contract, effective January 1, 1935.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
N. Orleans, La.	17 5	21 0	‡8.0	†13.0
Baton Rouge	16 5	20.0	†7 0	12.0
Alexandria	17.5	21 0	††8 0	10.0
Lafayette	18.0	21 5	‡‡8.0	12.0
Lake Charles	18.0	21.5	††8.0	12.0
Shreveport	16 0	19.5	†7.0	12.0
Knoxville, Tenn.	20 0	23 5	8.0	13.5
Memphis	18.0	21.5	8.0	10.5
Chattanooga	19 5	23.0	8.0	11.0
Nashville	19 0	22 5	8.0	13.0
Bristol	17.8	20 3	8 0	14.0

*Includes city tax of 1 cent.
‡Includes 2-cent parish tax. †Includes 1-cent parish tax.

Effective October 23, tank wagon gasoline refers to dealer instead of retail prices.

Price basis to dealers: Undivided dealers at dealer price less one-half cent.

Louisiana kerosene prices include 1-cent state tax.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA.

	Gasoline: Tank wagon†	Gasoline: Posted retail	Gasoline: Incl'ds tax of	Kero. tank wagon
San Francisco	16 5	18.5	4 0	11 5
Los Angeles	16.0	18.0	4 0	10.5
Fresno, Calif.	17.0	19.0	4.0	12.0
Phoenix, Ariz.	20.0	22 0	6.0	‡18.0
Reno, Nev.	19.0	21.0	5 0	13 0
Portland, Ore.	19 0	21.0	6 0	13.0
Seattle, Wash.	19.0	21.0	6.0	13.5
Tacoma	19.0	21.0	6.0	13.5
Spokane	22.0	24 0	6.0	16.5

*Retail prices posted by Standard Stations, Inc., a subsidiary.

†Prices are at company's plant or depots, as company does not operate stations. A 4-cent per gallon discount is given dealers and customers taking tank wagon lots except in Phoenix where the discount is 1 cent.

‡Includes 5-cent state tax.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Phil'delphia, Pa.	14.0	16.0	4.0	9.0
Pittsburgh	15.0	17.0	4.0	10.0
Allentown	14.5	16.5	4.0	10.0
Erie	15.0	17.0	4.0	9.0
Scranton	15.0	17.0	4.0	10.0
Altoona	15.0	17.0	4.0	10.0
Dover, Del.	14.5	16.5	4.0	10.0
Wilmington	14.5	16.5	4 0	9.0
Springf'd, Mass.	13 2	16.7	4 0	8.0
Worcester	13.3	16 8	4 0	7.5
Hartford, Conn.	12 3	15 8	3.0	7.5
New Haven	12 2	15.7	3 0	8.0
Providence, R.I.	12 0	15.5	3 0	7.0

Note—Tank wagon prices are those applicable to consumers purchasing lots of 100 or more gallons in one delivery.

Canada*

Imperial 3-Star Gasoline

IMPERIAL OIL, LTD.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Hamilton, Ont.	22 0	25.0	6.0	17.5
Toronto, Ont.	22 0	25 0	6.0	17.5
Brandon, Man.	30 3	33 3	7.0	21 8
Winnipeg, Man.	28.7	31 7	7 0	20.2
Regina, Sask.	30.0	33.0	7 0	21 5
Saskatoon, Sask	32 8	35.8	7 0	24.3
Edmonton, Alta.	32 2	35.2	7.0	23 7
Calgary, Alta.	29 5	32.5	7 0	21.0
Vancouver, B.C.	27.0	30.0	7.0	24.0
Montreal, Que.	24.0	27.0	6.0	17.0
St. John, N.B.	26.0	30.0	8.0	19.5
Halifax, N. S.	26.0	30.0	8.0	19.5

*Imperial gallon used in Canada.

Maritime provinces, all dealers 4 cents off service station price. All other provinces open dealers 3 cents per gallon off service station price, 1 cent additional to 100 per cent accounts.

Naphtha

STANDARD OIL CO (INDIANA)

	Tank wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15 0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax nor 2 per cent retail occupational tax.

Prices f.o.b. Chicago, March 12, 1935. Each of above prices subject to discount of 1 cent per gallon for 150-gallon lots if covered by contracts.

New York and New England

SOCONY-VACUUM CO., INC

	Gasoline: Posted dealer	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Albany, N. Y.	14.0	17.5	5.0	7.5
*Met. New York	14.25	18.0	5.0	7.25
*Br'kl'n, Queens	14 0	17.5	5.0	7.25
Buffalo	14.7	18.2	5.0	8.0
Rochester	14.7	18.2	5.0	8.5
Syracuse	14.5	18.0	5.0	8.75
Boston, Mass.	13.0	16.5	4.0	7.5
Portland, Me.	14.7	18 2	5.0	7.5
Manch't'r, N.H.	14.8	18 3	5 0	8.25
Burlington, Vt.	16.2	19.7	5.0	8 5

*Includes 2 per cent city sales tax.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Ohio points	16.5	18.5	5.0	*12 5

*Includes state tax of 1 cent, effective July 22.

Retail Price Changes

Regular-Grade Gasoline and Kerosene

Standard Oil Co. of New Jersey, May 6, advanced tank wagon gasoline 1.5 cents and station gasoline 3 cents in Roanoke. May 10, advanced tank wagon and station gasoline .3 cent throughout its marketing territory with the exception of Delaware and Wheeling, W. Va.

Standard Oil Co. of Louisiana, April 27, reduced tank wagon gasoline .5 cent and station gasoline 1 cent in Bristol. May 2, advanced tank wagon and station gasoline .5 cent in Alexandria, Lafayette, Lake Charles, Shreveport, Knoxville, Memphis, Chattanooga and Nashville.

Atlantic Refining Co., May 8, advanced tank wagon gasoline .2 cent and station gasoline 2.7 cents in Springfield; advanced tank wagon and station gasoline .2 cent and reduced tank wagon kerosene 1 cent in Worcester. May 6, advanced tank wagon and station gasoline .2 cent in Hartford, New Haven and Providence.

Standard Oil Co. of Indiana, May 10, advanced tank wagon kerosene .5 cent in Chicago, 2.4 cents in South Bend, 1.3 cents in Kansas City, .1 cent in Springfield, Mo., 1.6 cents in St. Louis, and reduced it .8 cent in Sioux Falls, 1.3 cents in Grand Rapids and 1.5 cents in Saginaw; advanced tank wagon gasoline .9 cent and station gasoline 2 cents in Peoria; advanced tank wagon and station gasoline .1 cent in Davenport, Sioux Falls, Kansas City and Springfield; advanced station gasoline .5 cent in Evansville; reduced station gasoline 2.2 cents in Wichita. May 14, advanced tank wagon kerosene .3 cent throughout its territory.

Magnolia Petroleum Co., May 10, advanced tank wagon and station gasoline 1 cent in Dallas. April 30, reduced tank wagon kerosene 1 cent in Fort Worth. May 9, advanced tank wagon kerosene 2 cents in Muskogee.

Socony-Vacuum Oil Co., Inc., reduced tank wagon kerosene as follows: May 7, 1.25 cents in Portland and .75 cent in Massachusetts; May 8, .5 cent in New York and Brooklyn; May 9, .5 cent in Burlington; May 10, .5 cent in Albany.

CANADIAN GASOLINE IMPORTS

Figures of the federal department of trade and commerce show that imports of natural casinghead, compression or absorption gasoline lighter than .6690 specific gravity in February totaled 744,342 gallons valued at $41,265, compared with 5,011,882 gallons valued at $338,897 in January. The entire February imports came from the United States, which in January furnished a little less than 50 per cent of the imports, the remainder coming from Peru.

NEWS FOR SALES DEPARTMENTS

Heat Transfer Problems Discussed by Chemists

Chemical engineering problems connected with heat transfer and with the transfer of material from one phase to another were discussed by Prof. Walter G. Whitman, of the Massachusetts Institute of Technology, at a joint meeting of the Society of Chemical Industry with the New York sections of the American Chemical Society, the Electrochemical Society, and the Societe de Chimie Industrielle. The meeting was held May 10, at the Chemists Club, 52 East Forty-first Street, New York, and was preceded by a dinner in honor of the speaker.

Professor Whitman's paper was entitled "Diffusional Processes." The transfer of material and of heat from one phase to another is largely a problem of diffusion through films at the fluid boundaries. Recent work has demonstrated, however, that mixing by turbulence within the main body of fluid is seldom so complete that non-uniformities can be disregarded. He cited numerous examples of transfer problems which are dominant in the practical operations of chemical industry. He showed that apparently diverse phenomena could be correlated by simple generalizations and emphasized the value of such correlations in the work of the chemist and chemical engineer.

Professor Whitman was formerly associate director of research of the Standard Oil Co. (Indiana). Last fall he was appointed head of the department of chemical engineering at the Massachusetts Institute of Technology. His outstanding scientific contributions have been in the fields of corrosion and the absorption of gases by liquids. His developments have contributed to increased efficiency in operation in various industries such as the recovery of gasoline from natural gas, the manufacture of liquid carbon dioxide and dry ice and the production of refrigerants for household use.

Professor Whitman graduated from the Massachusetts Institute of Technology in 1917 and took his master's degree there in 1920. He joined the staff of the Standard Oil Co. (Indiana) in 1926 and was appointed associate director of research of that company in 1930.

CANADIAN OIL COMPANIES

Following the death of F. B. Fretter, F. H. Littlefield of Toronto, Ontario, has been elected president of Canadian Oil Companies, Ltd., retaining also his position of general manager. The company is adding a $500,000 cracking plant to the refinery at Petrolia, Ontario. Sales for 1934 were approximately 1,750,000 gallons ahead of 1933, while the first three months of 1935 showed 650,000 gallons increase over the same period last year.

MURPHY ADDRESSES STUDENTS

George B. Murphy, manager of the Research and Development Laboratories of the Universal Oil Products Co., at Riverside, Ill., recently addressed the faculty and students of Armour Institute of Technology in Chicago.

The occasion was the monthly meeting of the Armour section of the American Institute of Chemical Engineers, and Mr. Murphy's subject was, "The Chemical Engineer in the Petroleum Industry."

NEW MOTOR OIL MARKETED

CALGARY, Alberta, May 11.—Union Oil Co. of Canada, Ltd., with head offices at Vancouver, British Columbia, has commenced the marketing of Triton motor oil in western Canada.

Congressman Jones Plans to Press Electrification

WASHINGTON, D. C., May 13.—Following his campaign for utilizing Texas Panhandle gas, Representative Marvin Jones of Amarillo is considering taking the matter up with the Rural Electrification Division just set up by President Roosevelt in connection with the $4,880,000,000 works relief fund.

Representative Jones has not made a final decision with respect to the question, but plans to talk the matter over with Morris L. Cooke, director of the Rural Electrification Program, to see what can be done, if anything.

He indicated the steps to be taken thereafter would depend upon the outlook after going over the question with Mr. Cooke and other federal officials connected with distributing the works relief money.

Representative Jones, while not opposing the proposal to pipe the gas from the field to St. Louis and Detroit, feels his suggestions for converting it into cheap power for use in the rural and small urban areas of Texas, would mean far more to the Lone Star State.

His attitude is that Texas' resources should be developed to the best advantage of Texas' citizens, observing that "if we don't utilize them, someone else will, and other states will benefit as much or more than Texas."

To Mr. Jones, one of the strong points in favor of rural electrification in the Panhandle and western Texas is that cheap power would permit extensive irrigation development, if desirable, by use of underground water resources in that territory, as well as providing more comforts and industrial advancement.

GASOLINE TAX CONFERENCE

The Mid-Continent group of the North American Gasoline Tax Conference will meet at the Alvin Hotel, Tulsa, June 7 and 8, to discuss a uniform form for report of taxes recommended at the national conference at Atlantic City, N. J., last year and a uniform tax law. Tax officials of Louisiana, Texas, Arkansas, Missouri, Oklahoma, Kansas, Colorado, and New Mexico are expected, and oil companies are invited to send representatives.

W. V. HARTMANN » » »

W. V. HARTMANN, vice president of the Gulf Refining Company, for several years has directed the sales of "That Good Gulf Gasoline" and many other products of the Gulf refineries. In addition, Mr. Hartmann has devoted considerable time to the efforts which have been and are still being made to bring about better marketing practices within the industry. He took an active part in the voluntary efforts first made a few years ago to bring about the general acceptance of a code of ethics among those charged with the responsibility of distributing petroleum products after they leave the refineries. With the adoption of the petroleum code under the NRA in 1933 he continued active in the work and at this time is chairman of the Marketing Committee for the important Regional District 1.

Mr. Hartmann has spent a lifetime in the marketing end of the petroleum industry. At the age of 18, he joined a jobbing concern of Cincinnati, Ohio, in a clerical capacity. Later he became an assistant agent at Evansville, Ind.

He joined the Gulf company in 1903, at that time a small organization in the refining and marketing divisions. He served in various capacities in the New York district and the states of the Southwest and Southeast. In 1905 he returned to the Pittsburgh offices as assistant to the manager of distribution. Later he became manager of the department and in 1929 was made vice president in charge of distribution, the position he now holds.

During the more than 30 years with the Gulf organization Mr. Hartmann has seen petroleum marketing practices almost completely changed, largely through the advent of the motor vehicle. The operations of his own company have greatly expanded until it is now one of the major distributors in the United States including all of the eastern, southeastern and southwestern sections of the United States and several states of the Middle West. The distribution is served by eight refineries located in four states.

April Motor Car Output Best Since High in 1929

April production operations were the best for any year in the industry's history, except for the record year of 1929, the preliminary estimate released today by the Automobile Manufacturers Association revealed.

Output of all American car makers for the month was estimated at 477,546 units which represented an increase of 6 per cent over March and an increase of 29 per cent over April of last year. Production for the first four months of this year, on the basis of this estimate, was 1,591,381 units, an increase of 41 per cent over the same period in 1934.

The estimate is based upon reports of factory shipments of the automobile companies.

The report is summarized below:

April, 1935	477,546
March, 1935	451,805
April, 1934	371,338
First four months 1935	1,591,381
First four months 1934	1,125,349

Tide Water Expands New Retail Dealer Service

A new idea in dealer co-operation and sales building has just been made a permanent set-up by the Tide Water Oil Co., in its Eastern Division, after an experimental period of more than one year, and will be expanded immediately to cover Tydol and Veedol dealers in this territory. Details of the plan were announced by F. L. Frost, sales training and development manager.

"One of the problems in the marketing of gasoline and oil is to secure the enthusiastic support of dealers in developing their maximum potential sales by intelligent neighborhood and platform solicitation and in maintaining the appearance of their stations to exert the greatest eye appeal and merchandising efficiency."

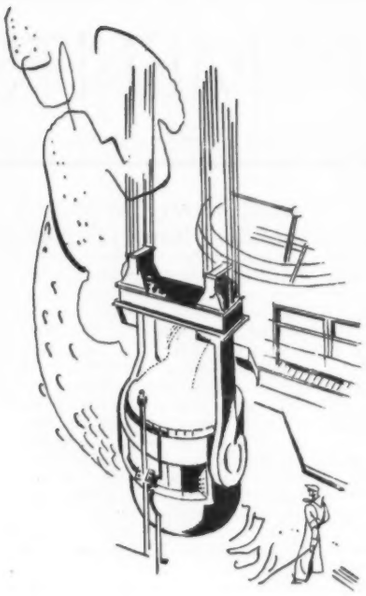
This work is carried on by units, each consisting of a 1½ ton panelled truck and a crew of three specially trained men. The duty of the crew captain is to talk with the dealer, explaining the service in its entirety. Meanwhile the other two men set about improving the station, cleaning, painting and polishing equipment where needed, and rearranging window displays. Equipment in the truck includes everything necessary in the line of signs and other advertising material to make the station attractive. This work is done with the purpose of setting an example for the dealer to follow permanently.

The captain of the crew then goes over the dealer's entire merchandising problems with him, checks up on his lubrication follow-up system, shows him how merchandising can be done at the pump, and explains Tide Water's service routine. He then takes the dealer or one of his men on a tour of solicitation throughout the neighborhood to prove to him that there are greater sales possibilities in his locality than he had realized.

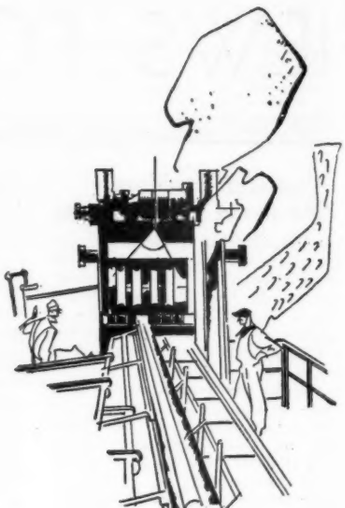
The Tide Water Oil Co. has received a flood of testimonal letters from dealers for whom this service has been rendered, as a result of which Tide Water has decided to expand the service to its entire Eastern Division.

SHELL AT PACIFIC EXPOSITION

A great shell, nearly 60 feet high, and one of the most unique buildings ever designed is being erected on the grounds of the California Pacific International Exposition by the Shell Oil Co.



DM STEEL



another TIMKEN *development*

DM Steel is a product of Timken metallurgical research plus extensive experience in the development and application of high temperature alloys for refinery service. Five years of laboratory testing and more than two years of actual use in several large refineries have definitely proved the superiority of Timken DM Steel Still Tubes.

The high strength of DM Steel—both creep and tensile—at elevated temperatures, combined with good oxidation and corrosion-resisting properties should make it of immediate interest to every refinery operator. It is one thing to develop a steel that possesses outstanding high temperature qualities, and another thing to manufacture tubes that display all of these qualities to the required degree.

Working closely hand-in-hand, Timken metallurgists and Timken seamless tube specialists have produced in DM Steel tubes material that represents a real economy in replacing carbon steel tubes for most refinery applications. We will be glad to discuss your requirements at any time.

THE TIMKEN STEEL & TUBE COMPANY, CANTON, OHIO

District Offices or Representation in the following cities: Detroit Chicago New York Los Angeles Boston Philadelphia Houston Buffalo Rochester Syracuse Tulsa Cleveland Erie Dallas Kansas City St. Louis Cincinnati Huntington Pittsburgh

World's Largest Producer of Electric Furnace Steel

TIMKEN STEEL TUBES

ELECTRIC FURNACE AND OPEN HEARTH • ALL STANDARD AND SPECIAL ANALYSES

NEWS FOR PETROLEUM REFINERS

New Naph-Sol Cracking Unit Begins Operations

MUSKEGON, Mich., May 14.—The Naph-Sol Refining Co. started operating its new $225,000 modern Dubbs cracking unit at the plant in the Muskegon oil field at 2 a.m., Saturday, May 11.

The new plant, most modern of its kind yet erected by any independent refinery in Michigan and the first specifically designed to run all Michigan crude oil, was completed late yesterday under the direction of Universal Oil Products Co. engineers, of Chicago.

It will require 72 hours to complete processing of the first high grade antiknock gasoline expected to be ready for marketing by Monday or Tuesday, it was explained by Walter E. Anderson, president and general manager.

Jack F. Helms, superintendent of the Naph-Sol plant since it was started here in the fall of 1930, also is in charge of the new unit which will employ about 10 additional men increasing the payroll from 50 to 60 operatives in the plant and office near the east city limits of North Muskegon.

Officials are hoping to increase their previous estimates of utilizing 1,200 bbls. a day of cracking stock which also would increase the gasoline output above 25,000 gallons a day. By-product gas will be sold to the West Michigan Consumers Co., local pipe line, for distribution to about 25 leading industries of Greater Muskegon under a long-time contract.

The plant will continue to run 2,500 bbls. a day or more of crude oil operating its skimming unit in conjunction with the cracking unit.

Government Claims on Richfield Co. Settled

A large step toward ending the Richfield Oil Co. receivership was taken recently when the Consolidated Oil Co. settled with the Government for its claims against the Richfield Co. The bid of the Consolidated Oil Corp. for the Richfield Oil Corp. of New York, a subsidiary, was accepted by the Federal court in Los Angeles on November 3, but the Federal Government appealed from the sale because of its unsettled claim.

The agreement between the two parties calls for a payment of $5,500,000 to the Government to be made by Consolidated sometime in May. Now the way is cleared for arrangements with the Richfield receivers. Under this deal the Consolidated Oil Corp. will pay $4,400,000 for the capital stock of the Richfield Oil Corp. of New York and the claims of the California company and its receivers against the New York corporation. The Cities Service Oil Co. has an option to buy a half interest in the company within one year.

The Richfield Oil Corp. of New York operates 200 service stations in the East also distributing through many independent dealers. It owns four large water terminals and 32 bulk gasoline plants, and a controlling interest in the Tiona Refining Co. of Tiona, Pa.

NEW REFINERY PROJECTS

Plans for the erection of two refineries in Canada were announced recently. Mongeau & Robert Co., Ltd., of Montreal, Quebec, are planning to erect a refinery and storage tanks at Point-aux-Trembles, an outlay of $500,000 being estimated. Another refinery with storage facilities to cost $3,000,000 is planned by the Pacific Oil Co. which has secured an industrial site also at Point-aux-Trembles.

Western Pennsylvania Refiners Want a More Representative Oxidation Test

OIL CITY, Pa., May 11.—Questioning the validity of the Indiana oxidation test for lubricating oils as an indication of comparative service performance, Dr. F. E. Williams, of the Quaker State Oil Refining Co. research laboratory, speaking before the technical group of the National Petroleum Association here, urged the substitution of a method of determination more comparable to actual engine operation conditions. Citing the procedure of M. Fairlie as published in The Oil and Gas Journal, Vol. 33; No. 45; page 58, as possibly a step in the right direction, Doctor Williams pointed out several of what he considered serious objections to the Indiana oxidation test.

In the Quaker State development laboratory, Doctor Williams said, the results of Indiana oxidation tests were found to conflict with tests on the dynamometer and in actual road tests. Oils which showed high resistance to "sludging" in the Indiana test broke down more readily than oils showing a comparatively rapid rate of oxidation in the test.

I. L. Klein, of Continental Refining Co., described the development and modern application of the "mercury distillation" process used by Sun Oil Co. Decomposition in the distillate fractions, Mr. Klein said, is avoided in the application of heat by means of mercury vapor rather than in a pipe still where skin temperature conditions may be a factor. The heat transfer, the speaker said, is highly effective, there being only a few degrees difference in the temperature of the oil and the mercury vapors. The process minimizes the amount of treatment required to finish the distillate cuts, a caustic wash sufficing as the undesirable materials are thrown down into the tar bottoms.

Another advantage is the cleansing and protective properties of the mercury on the steel distillation equipment. A run of four months without shutdown is common, and a new unit placed on stream is soon freed of mill scale and presents a highly polished interior. Amalgamation is not a problem, nor have any toxic effects been noted in the years this process has been developed to its present efficiency, Mr. Klein said.

The group is planning to visit the General Motors laboratories in Detroit during the week ending May 25. Present at the meeting Thursday night were:

Thomas McAuliffe, Hamilton W. Smith, Wes Dunlap, George L. Duke, M. D. Ritchie, all of the Pennsylvania Grade Crude Oil Association; L. D. Fulton, D. J. Harvey, Dr. G. O. Ebrey, of the Pennzoil Co.; A. W. Cole, C. R. Scott, L. M. Baltzell, W. B. Smith, of Wolverine-Empire Refining Co.; H. E. Shoemaker, Russell R. Buckham, John Weiser, of James B. Berry Sons Co.; L. A. Calkins, R. L. Sailer, Merle Cross, of Valvoline Oil Co.; W. J. Hannigan, Allen M. Cox, of Crew-Levick Co.; Charles H. Goss, D. S. Bleakley, K. G. Schulz, C. H. Alsberg, of Franklin Creek Refining Co.; H. W. Wagner, Paul W. Emery, of United Refining Co.; I. L. Klein, E. F. Hanna, of Continental Refining Co.; George J. Acton, R. J. Zimmerman, of Oil Creek Refining Co., and Dr. F. E. Williams, of Quaker State Oil Refining Co. Mr. Buckham is chairman of the group.

Decisions Given on Gasoline Allocation Appeals

The Refinery Board of Review, which held its regular monthly session on Monday, May 6, in Washington, D. C., for the purpose of reviewing appeals from gasoline production allocations fixed for the month of May, reported the following appeals and decisions rendered. All decisions granting increases were made subject to the ability of the national coordinator and allied agencies to procure all or any part of the aggregate quantity granted. To the extent that allocations are released or may become available such quantities, plus the reserve withheld, amounting to 364,000 bbls., shall be prorated among those companies to whom awards have been made.

The board announced that the next monthly session would be held in Washington, D. C., Thursday, June 6.

Appellant—	Dist. No.	May quota (bbls.)	Increase requested (bbls.)	Award (bbls.)
Allocating Agency	7	893,000	113,000	30,000
Allocating Agency	4	4,593,000	502,960	190,000
Allocating Agency	8	5,313,000	696,000	350,000
Phillips Petroleum Co.	5-A	462,000	43,000	(†)
General Petroleum Corp.	8	460,224	77,000	(*)
Union Oil Co.	8	441,179	53,821	(*)
Shell Oil Co.	8	324,896	92,104	(*)
Richfield Oil Co.	8	418,968	45,000	(*)
Standard Oil Co. of California	8	1,276,141	325,000	(*)
Associated Oil Co.	8	462,631	74,000	(*)
Texas Co.	8	438,737	24,000	(*)
Mohawk Petroleum Co.	8	48,000	24,000	denied
Utah Oil Refining Co.	7	109,883	15,117	15,000
Gulf Refining Co.	1	200,000	120,000	120,000
Rio Grande Oil Co.	8	97,338	5,000	(*)
Texas Co.	4	207,560	34,576	(*)
Texas Co.	5-A	332,780	56,712	denied
Humble Oil & Refining Co.	5-B	1,115,745	70,000	70,000
Standard Oil Co. of Louisiana	6-A	869,167	30,833	denied
Total		18,564,249	2,402,123	775,000
Less: Agency appeals in support of individual company exceptions		5,630,443	745,693	.....
Net totals		12,933,806	1,656,430	775,000

*Included in district appeal. †Decision withheld at appellant's request.

New Colorado Refinery Now Under Construction

DENVER, Colo., May 13.—A syndicate of Denver men including Joe D. Cook, Luke G. Smith and Ray Sims, have under construction at East Fifty-second Street and Colorado Boulevard a new refinery which will have a charging capacity of 500 bbls. daily. The plant will be equipped to recover gasoline, kerosene, fuel oil and road oil. When completed, the syndicate will incorporate as the Denver Refining Co. to take over and operate the property. Part of the crude supply will come from the Frannie Field, in Park County, Wyoming. A fleet of trucks will be placed in operation to transport the crude from the field to the refinery, probably one of the longest trucking routes for crude in the Rocky Mountain area. Joe D. Cook was one of the earlier developers of the fields in the Big Horn Basin in Wyoming and has been actively identified with the oil industry for many years. The new company will specialize in the marketing of fuel and road oils.

Three New Refineries Planned in Michigan

Tentative plans for the erection of three new independent refineries in central Michigan, one at Carson City, about 9 miles east of the new Crystal Township, Montcalm County, Field, another at Lansing, and a third near Bay City were reported this week.

E. G. Guy, refinery engineer and construction superintendent, who has directed the erection of several of the existing plants in Michigan, is said to be making plans for a new plant at Carson City.

R. O. McKee, formerly of the Roosevelt Oil Co., operators of Michigan's largest independent refinery at Mount Pleasant, has been named president and general manager of the Lakeland Refinery, Inc., which is planning to construct a 1,500-bbl. plant at Lansing at a cost of about $100,000. The plant is to be ready for operation on Michigan crude within three or four months.

Delbert Fortney, of Mount Pleasant, who is associated with the Strange & Fortney Oil Co., has tentative plans for the erection of a $350,000 cracking plant on a tract of 12 acres of former industrial property recently purchased in the village of Salzburg, near Bay City, it was reported.

Egloff Conducts Lecture Series in the Southwest

CHICAGO, May 11.—Dr. Gustav Egloff, of Universal Oil Products Co., will give a series of lectures in May, as follows:

May 13, Missouri School of Mines and Metallurgy, Rolla, Mo. Subject: "Modern Refining of Petroleum."

May 15, American Petroleum Institute, Tulsa. Subject: "Polymer Gasoline from Cracked Gases."

May 16, Oklahoma Agricultural and Mechanical College, Stillwater, Okla. Subject: "Modern Products from Petroleum."

May 16, University of Oklahoma, Norman, Okla. Subject: "The Cracking Process—A Universal Source of Hydrocarbons."

May 17, American Chemical Society, Southeast Kansas Section, Pittsburg, Kans. Subject: "Newer Products from the Cracking Process."

May 18, American Chemical Society, Wichita, Kans. Subject: "Modern Products of the Refinery."

NATURAL GASOLINE MANUFACTURE

Gas Contract Committee of the N.G.A.A. Reports

The following report of the Gas Contract Committee was made before the annual convention of the Natural Gasoline Association of America by J. W Cowles, Shell Petroleum Corp., chairman of the committee.

Gentlemen: The Gas Contract Committee cannot report any great amount of completed work during the past year. Having established a standard form of contract after years of chaos, we are very slow about recommending any material change in it. We realize, of course, that it has its defects but we more thoroughly realize that it has many advantages that most decidedly offset these defects. However, we are gradually working toward the time when we shall probably recommend changes in two respects; namely the residue gas section and the price clause.

The residue gas provision has always been a source of dissatisfaction. When we were compiling the standard form of contract I will warrant that we spent 50 per cent of our time in discussing and analyzing this feature. No objections have since been raised that were not thoroughly considered during that time and overruled. Yet they continued to be advanced and changes urged. Some parties want the manufacturer to deliver the surplus residue gas from one lease to another owned by the same company where there is a shortage of residue gas. Others want a minimum cost for boosting and transportation specified. Still others want the cost of treating the gas added to the deductible cost of boosting and transportation. It has also been suggested that a different division of the residue gas sales be made, it being urged that it would be more equitable to have a division approximating the percentages used in the price clause. Personally, I do not favor any of these changes but call them to your attention with the idea in mind that pressure is constantly being brought to incorporate them in the contract and we are faced with the probability that we shall have to acquiesce.

Price Clause

The second prospective change is the price clause. The fact that there is imminent a change in the methods for determining the gasoline content of casinghead gas so that it will more nearly equal the plant recovery, warns us that we must have a more equitable price clause. All contract men agree that the breaks in the percentages to be paid under the present contract form are too abrupt. For instance, why should gas testing 1.75 G.P.M. on a three cent market be worth 20 per cent, when gas testing 1.74 G.P.M. is worth only 15 per cent—a 33⅓ per cent increase in price for only .01 of a gallon content. It's absurd. No more so, however, than some other features. For example, we pay 20 per cent for gas testing .74 G.P.M. on a market of seven cents, which gives a gross value to this gas of 5.18 cents. On the other hand, we pay 20 per cent

(Continued on Page 99)

NEW PLANT ON GULF

Means & McGehee, Inc., of Houston are reported to be contracting for the construction of a gasoline extraction plant to treat the wet gas from C. B. Bunte's No. 1 Lackner, located in the Eureka Heights area, on the northwest outskirts of the Houston city limits. A pipe line will be laid to service the industrial concerns located along the Ship Channel. The plant will take 5,000,000 feet of gas daily from the well.

New Law Will Cut Panhandle Gasoline Production 400,000 Gallons Daily

By GEORGE WEBER

With the enactment of Texas State Bill No. 266, providing for the conservation of the state natural gas resources, the attention of the petroleum industry is directed to the huge Panhandle gas field. Although the bill is state-wide in its application, its express purpose is to bring about a curtailment of waste and a more equitable scheme of gas production in the Panhandle field. This two-fold purpose is well defined in the bill.

The new law gives the Texas Railroad Commission authority to prorate production and to stop the practice of waste as defined in its sections. Although originally meant to be effective immediately upon passage, the bill entails such a great amount of preliminary work by the commission that the effective dates were postponed. All points applying to sweet gas production and use are to take effect August 1, and those applying to sour gas, October 1.

The bill is based upon a number of exact definitions. A gas well is defined as one producing more than 100,000 feet of gas per barrel of oil. Gas containing 1½ grains or more of hydrogen sulphide per 100 cubic feet is defined as sour gas. Casing head gas is any gas indegenous to an oil stratum and produced together with oil.

Definitions of Waste

Continuing in Section 3 are named 13 definitions of waste which the commission is empowered to prevent. Outstanding are the following: the production of gas in excess of reasonable market or transportation facilities; the manufacture of carbon black without first stripping the gas; the use of sweet gas for the manufacture of carbon black; the venting of any dry gas either before or after stripping; the production of gas from a well producing oil from a stratum other than that in which the oil is found unless such gas is produced, and the production of more than 100,000 feet of gas to each barrel of crude oil unless such gas is so produced under allocation made by the commission. Prohibited also is the production of gas in an oil well from a stratum productive of natural gas only.

Specific uses for sweet and sour gas are given. Sweet gas may be used for light and fuel, for any efficient chemical manufacturing process other than the manufacture of carbon black, for repressuring into any oil or gas bearing stratum, and for the manufacture of natural gasoline provided the residue gas is returned to the ground. Sour gas may be used for these same purposes and in addition for the manufacture of carbon black, provided the gas is first stripped of the natural gasoline fraction. A further precaution against any subterfuge in carbon black plants is taken in stating that at least one pound of the product must be produced for every 1,000 feet of gas burned. Without this, some carbon black plants might be little else than vents with the production of carbon black held to a meaningless figure.

Since its inception the bill has fostered much interest among gas and natural gasoline companies. It is generally recognized that its enforcement will bring about a widespread rearrangement in the Panhandle Field. Repressuring of the residue gas will be an economic impossibility for a majority of the plants in the field. Therefore the provision prohibiting the venting of gas will cause the closing down of several plants in which there is no other outlet for the residue. Further, the new basis for allocating gas production will cut the supply of some plants to a figure where operation will be impracticable unless more wells are added to the gathering lines. This will in turn cause a great deal of activity in the laying of lines to wells hitherto unconnected. Still other natural gasoline plants which are processing sweet gas and are selling the residue to carbon black plants will be forced to close down.

Production to Decline

It is estimated by authorities that the production of natural gasoline will be cut 300,000 to 400,000 gallons daily or about 50 per cent of the present total production figure. In view of the size of the output from this field as compared with others in the Mid-Continent, the curtailment will amount to a decided decrease in the supply of natural gasoline. This 10 per cent reduction in the total United States production of natural gasoline will constitute a major factor in holding the market in its present strong position.

The end is seen for another evil, which, though not so widely publicized as that of venting gas, is considered as great if not greater a waste of the resources in the field. This is the practice of splitting the casing in a well producing both dry gas and oil, thus allowing their flow together. It has been responsible for the loss of a tremendous amount of oil in the ground. Production of gas and oil in separate casings in such wells will prevent this waste.

Gas Proration Effected

The provision for the ratable production of gas is patterned after the market demand bill for oil. Companies will be required monthly to report the amount of gas necessary to cover the month's demand. These reports will be used by the commission as a basis for the allocations. These allocations will be made within the zones laid down by the commission, and the gas production will be correlated according to the number and size of wells whether connected or unconnected into any outlets. In this way those wells which have had no outlet will be so provided if the pipe line companies are to meet the demand which they have reported to the commission. To preclude padding of these reports, the companies must show actual market demand for the totals which they submit.

The terms of the bill are generally explicit throughout with few points which require interpretation or expansion by the commission. One of the chief duties of the commission, however, is to divide any common reservoir or field into zones where practical. In the case of the Panhandle District it is believed that five zones will be laid out. The field differs widely at various points both as to the intensity of development and to the character of the gas. In the southeastern end in Wheeler and eastern Gray counties, the development has been intense. This section which is underlain with sweet gas may constitute one zone. The large area at the other end of the field lying in Moore and Potter counties contains relatively few wells, but is divided into two sour and sweet gas areas. These may be two other zones. Then that part of the field lying between is roughly divided along its length into sweet and sour gas areas. These are named only as possible zones into which the commission might divide the field.

After the zones are designated the commission will proceed with the proration of production within each zone. This will be done at a hearing to be held every month.

Another point which is left to the commission is the determination of hydrogen sulphide in the gas. There are a number of tests which give varying results. Although this might seem to be a minor point, a few grains difference in the content of the gas might make a marked difference in some areas where sweet and sour gas are intermingled. The silver nitrate method will probably be adopted.

While the commission is authorized to cut production of gas to 25 per cent of the open flow capacity of a well anywhere, the provision is made for holding the flow to as low as 15 per cent in areas where sour gas is apt to intermingle with sweet gas due to excessive drain at any point.

By no means an unimportant part of the bill is Section 26. This section states that should any part of the bill be declared invalid the remainder of the bill shall not be in any way affected.

Enforcement Postponed

The situation at present among the companies owning production and natural gasoline plants in the field is one of watchful waiting. Before any definite steps are taken the Railroad Commission must complete a part of the great amount of work now before it. The June hearing is expected to clarify most of the points where the commission has been given freedom of action. A large majority of the companies involved are ready and anxious to operate with the commission in bringing about the change. This was shown when the bill was nearing completion at Austin. With a few exceptions representatives of those companies with interest in the field were unanimously in favor of its passage. Those taking exception were in favor of allowing sweet gas to be used in the manufacture of carbon black.

Total Heats Discussed at C.N.G.A. May Meeting

The program of the May meeting of the California Natural Gasoline Association will consist of two main addresses. E. G. Ragatz and E. R. McCartney of the Union Oil Co. will present and discuss some newly developed total heat charts for the components of natural gasoline. These men have had wide experience in the application of physical and mathematical data to natural gasoline rectification and the charts which they are to describe will be widely anticipated by every engineer and chemist in California's natural gasoline and refining industries.

F. L. Kallam, of Industrial Engineers, Inc., will describe his continuous vapor pressure recorder. Utilizing a split stream sample of gasoline heated to 100° F., the apparatus injects the sample into a float-controlled vapor pressure chamber where the vapor pressure is taken and the result recorded on a continuous vapor pressure and temperature recorder.

Refined Oil Price Trend in the Chicago Area Continues to Point Upward

By SPECIAL CORRESPONDENT

CHICAGO, May 13.—Leading grades of refined petroleum products continue to give a good account of themselves in this market and the outlook for all these products is considered to be highly favorable. The double-action on kerosene and heating oil tank wagon price adjustment in the last few days reflects the fact that the persistent improvement in tank car gasoline markets is spreading to other products. Sentiment continues largely optimistic here and in other middle states market centers.

The current rate of gasoline consumption, while held back by weather not very favorable to motoring, has been sufficient to sustain the strong market position of gasoline or add fractionally to the prices governing it in the refinery business. Spot market dealings continue of limited extent, but the rate of contract instructions indicates that jobbers are doing a good business. Since they are not adding materially to their stocks, by their own admission, current volume of business is regarded as good, considering everything. There is some inclination on the part of jobbers to withhold shipping instructions on the theory that the federal gasoline tax is due for repeal shortly and that they will do well to make purchases after, rather than before, this happens. However, best informed observers say there is no assurance as to repeal of the tax.

Michigan Disturbed

The tightening up of enforcement of regulations in East Texas has made it more and more difficult for the marketing trade to buy any kind of petroleum products from that sector, which has thrown more and more dependence on the older sources of supply of the general Mid-Continent region. About the only exception to the firm market conditions in the central states arising from this condition is seen in Michigan and nearby areas, where it appears there has been some trouble from cheap gasoline from the East, as well as from California gasoline moved in from the Atlantic Seaboard on favorable transportation rates.

Refiners in general are talking about the possibility of some slight further advance in gasoline prices. However, they are figuratively looking over their shoulders in apprehension now, due to the momentum being attained by the movement for higher crude prices in the Mid-Continent. The marketing and refining trade in this area does not appear to be very friendly to the talk of higher crude quotations at this time. It is feared that it will be forcing the issue and that the refined price structure has not yet reached a point where the present crude prices are justified. They do not deny, however, that later in the year there may be strong advisability for an advance in crude.

Campaigns Under Way

Major oil marketing companies are hard at work on their early summer sales and advertising campaigns. The emphasis, as usual, is on the house-brand gasoline which, it appears, is being put out under specifications comparing well with anything in the past or perhaps actually superior. Motorists' preferences for gasoline are being concentrated more than ever on quality material, according to a concensus of representative companies.

Kerosene

Kerosene prices, which have been highly irregular and ragged for a long period, are now well along to a strong position, on the basis of the price adjustments of the last few days. It is difficult to determine just how generally the new prices are being observed. The kerosene season has been late this year and kerosene likely will extend well through the month of May, carrying tractor distillates, which

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Crude Oil Prices

(Continued from Page 41)

Humble Oil & Refining Co. and Texas Co. Effective September 20 in Salt Flat by Shell Petroleum Corp.

Rocky Mountain States

Iles light (Sept. 29, 1933)	$.96
Iles, heavy (Sept. 29, 1933)	.90
Florence, Colo. (June 17, 1933)	.80
Fort Collins and Wellington, Colo. (June 17) (See Salt Creek prices)	
Big Muddy (Sept. 29, 1933)	1.01
Frannie, light (May 1, 1934)	.70
Frannie, heavy (Sept. 29, 1933)	.62
Salt Creek and LaBarge (Sept. 29, 1933)	
See Stanolind Mid-Continent price schedule	
Grass Creek, light (Sept. 29, 1933)	1.18
Grass Creek, heavy (Sept. 29, 1933)	.62
Elk Basin (Sept. 29, 1933)	1.18
Rock Creek (Sept. 29, 1933)	1.02
Lance Creek (Dec. 16, 1932)	.92
Hudson (June 2, 1931)	.65
Lost Soldier (Sept. 30, 1933)	.88
Hamilton Dome, all grades (Feb. 16, 1935)	.57
Torchlight (Sept. 29, 1933)	1.18
Greybull (Sept. 29, 1933)	1.18
Pondera (Sept. 29, 1933)	1.25
Sunburst (Sept. 29, 1933)	1.35
Cat Creek, Montana	1.07
Hogback (Sept. 29, 1933)	1.11
Lea County, N. Mex. (Sept. 29, 1933)	.75
Maljamar (Sept. 29, 1933)	.70
Artesia-Jackson (Dec. 1, 1933)*	.75

Note—Salt Creek, Torchlight, Elk Basin, Grass Creek, Frannie, Greybull, Hogback and Iles by Stanolind Oil & Gas Co. Elk Basin, Grass Creek light, Big Muddy, Rock Creek and Sunburst by Ohio Oil Co. Lost Soldier posted by Producers & Refiners Corp. Artesia, Jackson and Maljamar posted by Continental Oil Co. Lea County, effective September 29, 1933, by Humble Oil & Refining Co. and other buyers; Fort Collins, Wellington, Orchard, Florence, Big Muddy, Cat Creek, Rattlesnake and Table Mesa by Continental Oil Co. Osage posted by Arro. Hamilton Dome, Wyo., by Stanolind Oil & Gas Co. Pondera, Mont., by Ohio Oil Co. (Stanolind Oil & Gas Co., effective January 1, 1935, posted $1 per barrel in Pondera.)

*Continental Oil Co.

North Louisiana and Arkansas

Smackover, Ark. (all grades)	$.70
Tullos, Urania, La. (Jan. 13, 1934)	.87
Nevada, Ark. (Sept. 29, 1933)	.60
East El Dorado (Sept. 29, 1933)	.70
Converse, La. (Mar. 17, 1934)	1.03
Elm Grove, La. (Sept. 29, 1933)	.75
Holly, La. (Nov. 17, 1934)	1.03
Pleasant Hill, La. (Mar. 17, 1934)	1.03
Zwolle, La. (Mar. 17, 1934)	1.03
Champagnolle, Ark. (Mar. 17, 1934)	.81
Lisbon, Ark. (Mar. 17, 1934)	1.03
Stephens, Ark. (Sept. 29, 1933)	.70
Urbana, Ark. (Mar. 17, 1934)	.60
Other fields (See gravity table)	

Note—Smackover: Effective September 29, 1933, Texas Co., Magnolia Petroleum Co., Standard of Louisiana, Louisiana Oil Refining Corp., Gulf Refining Co. and Phillips Petroleum Co. East El Dorado posted by Magnolia Petroleum Co. and Gulf Refining Co., Navada by Standard Oil Co. of Louisiana. Urbana posted by H. L. Hunt, Inc., and Louisiana Oil Refining Co. Converse, Holly, Zwolle and Urbana by Standard Oil Co. of Louisiana; Elm Grove by Simmons Oil & Refining Co.; Pleasant Hill by Standard Oil Co. and Magnolia Petroleum Co.; Champagnolle by Standard Oil Co. and Lion Oil & Refining Co.

Eastern States

TIDE WATER PIPE CO.
(Effective Feb. 4, 1935)

Bradford, Pa.	$2.35
Allegany, N. Y.	2.35

SOUTH PENN OIL CO.
(Effective Feb. 4, 1935)

Pennsylvania Grade Oil in National Transit Lines (Bradford Field)	$2.35
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	2.02
Pennsylvania Grade Oil in Eureka Pipe Line lines	1.97
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.87
Corning Grade Oil in Buckeye Pipe Line Co.'s lines (Oct. 2, 1933)	1.37

PENNZOIL CO.
(Effective Feb. 4, 1935)

Pennsylvania Grade Oil in National Transit Lines:	
Group A (Includes Cochran, Franklin, Hamilton and Doolittle districts.)	$2.27
Group B (Includes Titusville district.)	2.26
Group C (Includes Turkey and Tidioute districts.)	2.25
Group D (Includes Bear Creek and Porkey districts.)	2.24
Group E (Includes Eldeneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kennerdell, Emlenton, Tiona, Lacey and Kinzua districts. Price depends on length of pipe line haul to plant at Oil City.	2.21

PURE OIL CO.
(Effective Jan. 4, 1935)

Cabin Creek, W. Va.	$1.82
Bradford Hollow, W. Va.	1.82
Kelly Creek, W. Va.	1.77

CREW-LEVICK CO.
(Effective Jan. 4, 1935)

Oil City-Titusville	$2.12

Middle Western States

OHIO OIL CO.

Lima (Feb. 1, 1935)	$1.15
Illinois (Jan. 5, 1934)	1.13
Princeton, Ind. (Jan. 5, 1934)	1.13
Plymouth	Shut in
Western Kentucky (May 26, 1934)	1.03
Midland, Mich. (Sept. 30, 1933)*	1.02
West Branch, Mich.	.86
Oceana, Mich. (Oct. 5, 1933)	.90
Somerset, Ky. (Sept. 30, 1933)	1.23

*Posted by Pure Oil Co. and Simrall Pipe Line Co. Producers Pipe Line Co. pays 5 cents per barrel over Pure Oil Co.'s posted prices. West Branch, Mich., posted by Simrall Pipe Line Co. Somerset, Ky., crude purchased by Ashland Refining Co., Ashland, Ky., and posted prices includes premium. Oceana posted by Old Dutch Refining Co. and Naph-Sol Refining Co.

Canada

Ontario (September 9, 1933):	
Petrolia*	$2.10
Oil Springs	2.17
Turner Valley (May 21, 1934):†	
Clear naphtha	$2.55
Discolored naphtha	2.37
Crude oil, 50 gravity	2.19
Crude oil, 45 to 49.9	2.07
Crude oil, 40 to 44.9	1.50

*Imperial Oil, Ltd. †Imperial Oil, Ltd., and Regal Oil & Refining Co.

Mexico

Panuco*	$1.01

*F.o.b. ship, based on March transactions and exclusive of production and export taxes and bar dues.

California Crude Oil Prices

STANDARD OIL CO. OF CALIFORNIA
(Effective September 6, 1933)

For current purchases of crude oil at the well (unless otherwise specified). (All gravities above those quoted take highest price offered in that field.)

Gravity—	Long Beach	Seal Beach, Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda, Brea Canyon	Athens-Rosecrans	Torrance	Richfield	Whittier, La Habra	Montebello	Santa Fe Springs	La Habra-Coyote	Midway-Sunset, Elk Hills, Buena Vista Hills	Lost Hills	Coalinga	Coyote
14-14.9	$.65	$.65	$.65	$.65	$.65	$.65	....	$.65	$.65	$.65	$.65	....	$.65	$.57	$.57	$.57	$.65
15-15.9	.65	.65	.69	.66	.69	.69	....	.66	.65	.65	.65	....	.65	....	....	....	.65
16-16.9	.66	.65	.72	.73	.69	.73	....	.69	.67	.68	.65	....	.65	....	....	....	.68
17-17.9	.69	.65	.75	.76	.73	.76	....	.72	.70	.71	.65	....	.68	....	....	....	.68
18-18.9	.72	.65	.78	.80	.76	.79	....	.75	.74	.74	.65	....	.71	.61	.61	.59	.71
19-19.9	.75	.65	.81	.83	.80	.82	....	.78	.78	.78	.65	....	.74	.64	.65	.62	.74
20-20.9	.78	.68	.83	.87	.83	.85	....	.81	.82	.81	.66	....	.78	.67	.69	.65	.78
21-21.9	.81	.72	.86	.90	.87	.88	....	.83	.85	.84	.69	$.72	.81	.70	.73	.68	.81
22-22.9	.84	.76	.89	.94	.90	.92	....	.85	.89	.87	.72	.76	.84	.73	.76	.72	.84
23-23.9	.88	.81	.92	.97	.94	.95	$ .82	.89	.92	.90	.76	.79	.87	.77	.79	.75	.87
24-24.9	.91	.87	.95	1.01	.97	.98	.86	.92	.97	.93	.80	.83	.90	.81	.82	.78	.90
25-25.9	.94	.89	.98	....	1.00	1.01	.90	.95	1.00	....	.85	.87	.93	.85	.85	.81	.93
26-26.9	.97	.93	1.01	....	1.04	1.04	.94	.98	1.04	....	.89	.90	.96	.89	.88	....	.96
27-27.9	1.00	.98	1.04	....	....	1.07	.97	....	1.08	....	....	.94	.99	.93	.91	....	.99
28-28.9	1.03	1.02	1.07	....	....	1.10	1.01	....	1.11	....	....	.98	1.02	.97	.94	....	1.02
29-29.9	1.06	1.05	1.09	....	....	....	1.04	....	1.15	....	....	1.01	1.05	1.01	.97	....	1.06
30-30.9	1.09	1.10	1.12	....	....	....	1.08	....	....	....	....	1.05	1.09	1.05	1.00	....	1.09
31-31.9	..	....	....	....	....	....	1.12	....	....	....	....	1.06	1.12	1.09	....	....	1.12
32-32.9	....	....	....	....	....	....	1.16	....	....	....	....	1.12	1.16	1.13	....	....	1.15
33-33.9	....	....	....	....	....	....	..	....	....	....	....	1.16	1.18	1.17	....	....	1.18
34-34.9	....	....	....	....	....	....	..	....	....	....	....	1.19	1.21	....	....	....	1.21
35-35.9	....	....	....	....	....	....	..	....	....	....	....	1.23	....	....	....	....	....
36-36.9	....	....	....	....	....	....	..	....	....	....	....	1.26	....	....	....	....	....
37-37.9	....	....	....	....	....	....	..	....	....	....	....	1.30	....	....	....	....	....
38-38.9	....	....	....	....	....	....	..	....	....	....	....	1.34	....	....	....	....	....

Additional Standard Oil Quotations

Mountain View—Effective July 3, 1934, the following are the prices of the Standard Oil Co. of California for its current purchases of crude oil at the well in the Mountain View Field: 14 to 19.9 degrees, 57 cents; 20-20.9, 58 cents; 21-21.9, 59 cents; 22-22.9, 61 cents; 23-23.9 63 cents; 24-24.9, 66 cents; 25-25.9, 69 cents; 26-26.9, 72 cents; 27-27.9, 75 cents, 28-28.9, 78 cents; 29-29.9, 81 cents; 30-30.9, 84 cents; 31-31.9, 87 cents; 32-32.9, 90 cents; 33 degrees and above, 93 cents.

Elwood Terrace—F.o.b. ship, 33 degrees, $1.03; 34 degrees, $1.06; 35-35.9, $1.09; 36-36.9, $1.12; 37 degrees and over, $1.15.

Newhall—14 degrees and over, 57 cents.

McKittrick and Kern River—14 degrees and over, 57 cents.

Wheeler Ridge—14 to 17.9 degrees, 57 cents; 18-18.9, 58 cents; 19-19.9, 61 cents; 20-20.9, 64 cents; 21-21.9, 67 cents; 22-22.9, 70 cents; 23-23.9, 73 cents; 24-24.9, 76 cents; 25 degrees and over, 79 cents.

Kettleman Hills—33-33.9 degrees, 93 cents; 34-34.9, 96 cents; 35-35.9, 99 cents; 36-36.9, $1.02; 37-37.9, $1.05; 38-38.9, $1.08; 39 degrees and over, $1.11.

The Texas Co. posted in Shiells Canyon, South Mountain and Santa Paula as follows: 14 to 17.9, 57 cents; 3 cents added for each degree up to and including 26-26.9 degrees at 84 cents; then 4 cents added for each degree up to and including 30 degrees and over at $1. Company posts Standard Oil Co.'s Montebello prices in Montebello and North Whittier, and posts Standard Oil Co. prices in Signal Hill, Alamitos Heights, Huntington Beach, Torrance, Richfield and Santa Fe Springs, all effective September 6.

General Petroleum Co. posts Standard Oil Co. prices in Athens, Rosecrans and Signal Hill; Alamitos Heights up to 26-26.9; Santa Fe Springs up to 35-35.9; Richfield up to 25-25.9; Brea Canyon and Olinda up to 25-25.9, and Torrance up to 25-25.9.

Union Oil Co., effective September 6, posts same price as Standard Oil Co. in all fields in which both purchases, excepting that in Athens-Rosecrans, Union Oil Co. posts 21-21.9, 72 cents, and 33--33.9, $1.18; 34-34.9, $1.21, and 35-35.9, $1.24.

Associated Oil Co., effective September 6, posted same prices for the same grades as Standard Oil Co. of California, excepting that in some fields its gravity scale stops as follows: Huntington Beach, 26 degrees and over; Seal Beach and Alamitos Heights, 26 degrees and over; Coyote Hills, 23 degrees and over; Richfield, 25 degrees and over; Torrance, 25 degrees and over; Inglewood, 24 degrees and over; Santa Fe Springs, 35 degrees and over; Midway-Sunset, Elk Hills, Buena Vista Hills, 30 degrees and over. Also Associated pays 52 cents for oil of 11 to 13.9 gravity in McKittrick Kern Front, Kern River, Midway-Sunset, Elk Hills, Buena Vista Hills and Coalinga.

California Oil Field Operations for March, 1935

According to figures collected by the American Petroleum Institute, the total production of crude oil in California for March amounted to 15,431,203 bbls., an average of 497,781 bbls. per day. This is a decrease of 757 bbls. per day under February production.

Total stocks of crude and all products in Pacific Coast territory decreased during the month 1,528,192 bbls. The total stocks at the end of the month were 124,244,889 bbls. The total stock decrease for 1935, up to March 31, was 1,973,428 bbls.

Fifty-seven wells were completed during the month with an initial daily production of 68,952 bbls., compared with 52 wells completed during February with an initial production of 70,517 bbls.

CRUDE PETROLEUM PRODUCTION

(Figures of Production and Stocks are in barrels of 42 gals.)

	Total production	Daily average		
Group No. 1:	March	Mar., 1935	Feb., 1935	Mar., 1934
Belridge—North	205,057	6,615	5,686	7,246
Belridge—South	75,397	2,432	2,471	2,061
Coalinga	575,906	18,578	19,419	16,639
Edison	29,963	1,289	1,014	.....
Elk Hills	241,937	7,804	8,323	11,056
Fruitvale	116,709	3,765	3,784	3,727
Kern River	331,706	10,700	10,913	9,443
Kettleman Middle Dome	3,364	108	442	269
Kettleman North Dome	2,018,030	65,098	67,335	54,618
Lost Hills	138,924	4,481	4,840	3,402
McKittrick	100,994	3,258	3,154	3,170
Midway-Sunset	1,596,376	51,496	53,822	53,990
Mountain View	385,187	12,425	14,060	3,988
Mount Poso	376,166	12,134	11,930	8,187
Round Mountain	151,753	4,895	4,893	5,996
Wheeler Ridge	13,607	439	421	437
Group No. 2:				
Capitan	21,950	708	872	341
Elwood	309,903	9,997	9,496	12,254
Rincon	36,393	1,174	1,415	1,544
San Miguelito	16,685	538	693	927
Santa Barbara	104,810	3,381	4,077	511
Santa Maria	126,785	4,090	4,648	4,673
Summerland	1,819	59	45	67
Ventura Avenue	581,434	18,756	23,326	31,848
Ventura-Newhall	125,835	4,059	4,010	3,392
Watsonville	1,860	60	60	60
Group No. 3:				
Brea-Olinda	322,913	10,416	9,870	9,120
Coyote—East	83,845	2,705	2,669	1,899
Coyote—West	303,674	9,796	9,061	8,517
Dominguez	655,513	21,145	19,224	17,834
Huntington Beach	1,230,118	39,681	39,002	40,120
Inglewood	324,990	10,483	9,969	9,301
Lawndale	4,439	143	126	174
Long Beach	2,034,907	65,642	65,834	62,262
Los Angeles-Salt Lake	25,541	827	769	854
Montebello	179,777	5,799	5,984	5,114
Playa Del Rey	491,658	15,860	8,989	9,014
Potrero	11,353	366	402	418
Richfield	249,268	8,041	7,934	7,216
Rosecrans	87,972	2,838	2,874	2,479
Santa Fe Springs	1,201,710	38,765	37,760	41,906
Seal Beach	285,189	9,200	9,244	10,939
Torrance	208,762	6,734	6,716	6,390
Whittier	31,024	1,001	982	1,128
Total March	15,431,203	497,781	498,538	474,531
Total February	13,959,063	498,538		
Decrease	*1,472,140	757		

*Increase.

STOCKS HELD IN PACIFIC COAST TERRITORY BY CALIFORNIA OIL COMPANIES

	Mar. 31, 1935	Feb. 28, 1935	Mar. changes	Mar. 31, 1934
1. Non-gasoline-bearing crude, residuum, gas and Diesel oils	64,586,972	62,898,910	—1,311,938	84,536,718
2. Gasoline-bearing crude	36,892,740	37,471,497	—578,757	35,842,081
3. Unblended natural gasoline	2,896,470	2,703,410	+193,060	2,432,566
4. Gasoline (not including distributing and service stations)	10,936,972	10,907,504	+29,468	13,457,734
5. Naph ha distillates	*1,105,673	*1,254,095	—148,422	*1,092,520
6. All other stocks	†7,826,062	†7,537,665	+288,397	†6,784,811
7. Total	124,244,889	125,773,081	—1,528,192	144,146,430
*Estimated amount of unfinished gasoline contained in Item No. 5	904,051	985,456		840,046
†Coke included in Item No. 6	549,083	558,075		622,901

OIL FIELD DEVELOPMENT

	New rigs up	Active drilling	Producers completed	Daily initial output	Active producing	Abandoned wells: Drillers	Abandoned wells: Producers
Group No. 1:							
Belridge—North	1	3	3	7,830	27	..	..
Belridge—South	..	...	...	.....	129	..	..
Coalinga	3	6	...	.....	973	..	..
Edison	4	15	6	1,167	22	2	1
Elk Hills	..	...	...	.....	157	..	2
Fruitvale	1	1	...	.....	69	..	..
Kern River	5	2	...	.....	1,480	..	..
Kettleman Middle Dome	..	1	...	.....	2	..	..
Kettleman North Dome	2	22	2	10,583	87	..	..
Lost Hills	..	1	1	112	317	..	..
McKittrick	..	1	...	.....	188	1	..
Midway-Sunset	6	5	6	2,280	2,506	..	2
Mountain View	9	15	7	8,997	60	2	..
Mount Poso	8	11	5	4,570	161	..	..
Round Mountain	4	1	3	3,352	52	..	..
Wheeler Ridge	..	...	...	.....	34	..	..
Group No. 2:							
Capitan	..	1	...	.....	14	..	..
Elwood	..	3	...	.....	40	..	..
Rincon	..	1	...	.....	29	..	..
San Miguelito	1	1	...	.....	3	..	..
Santa Barbara	1	3	2	819	67	..	1
Santa Maria	2	3	...	.....	188	..	..
Summerland	..	...	...	.....	17	..	..
Ventura Avenue	..	10	...	.....	178	..	..
Ventura-Newhall	5	9	...	.....	476	4	..
Watsonville	..	...	...	.....	7	..	..
Group No. 3:							
Brea-Olinda	..	...	...	.....	362	..	..
Coyote—East	..	1	1	26	79	..	..
Coyote—West	..	3	1	1,416	33	..	..
Dominguez	3	3	1	1,548	77	..	..
Huntington Beach	5	3	2	2,007	485	..	1
Inglewood	3	5	...	.....	194	..	..
Lawndale	..	1	...	.....	6	..	..
Long Beach	9	32	11	2,477	1,138	..	1
Los Angeles-Salt Lake	..	...	...	.....	128	..	..
Montebello	..	2	...	.....	171	1	..
Newport	..	...	...	.....	1	..	..
Playa Del Rey	11	14	4	21,674	164	..	1
Potrero	..	...	...	.....	13	..	..
Richfield	..	...	...	.....	237	1	..
Rosecrans	..	1	...	.....	69	..	..
Santa Fe Springs	..	10	1	100	498	..	1
Seal Beach	1	1	...	.....	116	..	1
Torrance	..	1	...	.....	478	..	3
Whittier	..	...	...	.....	163	..	..
Miscellaneous Drilling	5	32	...	.....	.....	10	..
Group No. 4:							
Delano Gas Field	2	2	...	.....	1	..	..
Dudley Ridge Gas Field	..	...	...	.....	1	2	..
Semi-Tropic Gas Field*	..	...	1	Gas	.....	..	..
Total March	89	227	57	68,952	11,697	23	14
Total February	84	207	52	70,517	11,605	26	21
Increase	5	20	5	†1,565	92	†3	†7
Average for year 1934	53	196	38	47,563	11,053	21	17
Average for year 1933	30	124	21	22,842	9,199	14	18
Average for year 1932	18	108	15	13,069	8,928	16	14

*Located approximately 18 miles southwest of Delano in Kern County and 30 miles northwest of Bakersfield. †Decrease.

Vice President H. B. Fell Explains I.P.A.A. Policy

The position of the Independent Petroleum Association of America is further explained in a letter from H. B. Fell, vice president, to The Oil and Gas Journal, which follows:

"The position of the Independent Petroleum Association of America on federal legislation pertaining to the petroleum industry is the same as it has been and was not changed in the slightest degree by the action taken by the directors on May 6. The only thing the directors did was to endeavor to clarify more definitely just what the position of the association is on this subject, due to the fact, particularly, that some people have stated the association was in favor of federal control of the oil industry, which statement is not a true statement of fact, as the association has never favored such control but has only favored and continues to favor such federal legislation as is necessary to provide for the conservation of our natural petroleum resources and the stabilization of the petroleum industry, and such legislation must provide for the accomplishment of a permanent, effective balance of supply with demand, supply consisting of the three elements of imports, withdrawals from storage and domestic production, and demand consisting of the two elements of exports and domestic consumptive demand.

"The principles of federal legislation that the Independent Petroleum Association considers necessary to accomplish these purposes are: a fixed limitation of imports; limitation of withdrawals from storage; federal allocation of quotas for movement in commerce and production quotas to each oil-producing state, with the understanding that so long as a state keeps its production within the federal allocation the state shall have exclusive control, but at any time the production in a state exceeds the federal allocation the federal agency shall have the authority to control and regulate shipments in commerce and production within the state; provision for planned orderly development by agreement of a majority of operators in ownership and numbers in the area; the creation of a federal agency of either five or seven to administer the law, this agency to be composed of the Secretary of the Interior as chairman and four or six members to be appointed by the President from nominations by the industry; and the inclusion in any federal legislation that may be enacted of a provision authorizing an interstate compact between the oil-producing states for the proper control of production within those states and further providing that whenever two or more oil-producing states enter into such a compact they shall be excluded from the provisions of the federal legislation so long as they keep their total production within the combined federal allocation to those states. These principles which have heretofore been approved by the annual membership meeting of the association held in Forth Worth, Tex., in December, 1934, are included in Senate Bill S-2027, as introducted in the first session of the Seventy-fourth Congress by Senator Elmer Thomas of Oklahoma.

"Such legislation will permit an impartial body to make allocations to the states, then giving the states full opportunity to handle all matters within their borders themselves, but will also provide for such federal aid or assistance as is necessary to maintain a balance of supply with demand in case any state or states fail to keep production within the federal allocation. This, our association believes, is necessary legislation to provide for federal co-operation in bringing about the fundamental principles essential to the future welfare of the industry, and if these principles are made effective, it is the view of the Independent Petroleum Association of America that most of the evils of the industry will be eliminated.

"This does not provide for federal control of the petroleum industry or the making of the petroleum industry a public utility, both of which this association opposes and has always opposed, but the specific statement was included in the resolutions passed by the board of directors in order that there might be no misunderstanding of the exact position of the association on these matters.

"It was also stated specifically that we opposed the new proposals that have been made pertaining to the National Industrial Recovery Act, such as S-2445, but that we do favor an extension of the principles contained in the existing National Industrial Recovery Act. Many of the principles contained in the existing National Industrial Recovery Act are included in the program of this association, particularly those principles applying to the balancing of supply with demand which is the basis of the production section of the petroleum code.

"The fact that oil is a migratory, irreplaceable natural resource and that a very large percentage of the recoverable reserves in known fields lie under wells of small but settled production, makes it necessary, in the opinion of the Independent Petroleum Association of America, that there be federal legislation permitting the federal Government to do those things that are necessary to balance supply with demand and authorizing the federal Government to supplement the work of the states in regulating production where any state fails to properly control its own production."

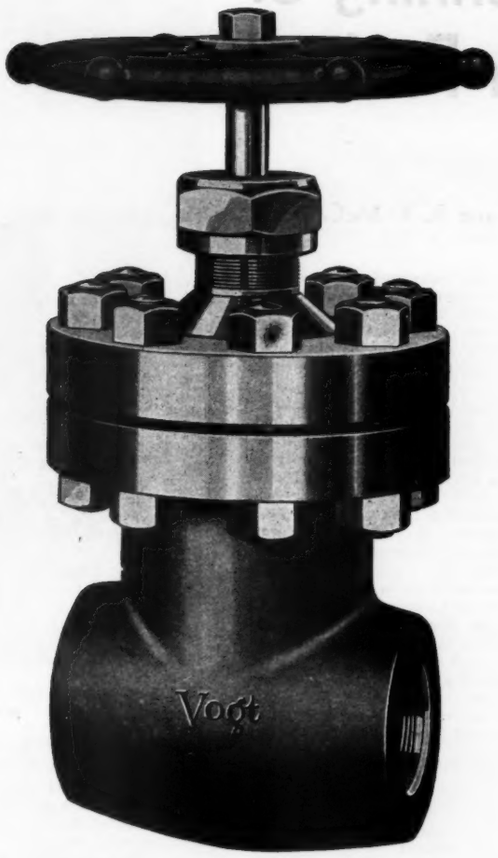
Gasoline Market Shows Fresh Vigor in Group 3

(Continued from Page 38)

level of tank car prices, which, in view of freight differentials, they declare to be so high as to make competition with eastern kerosene difficult. Oklahoma kerosene at this season goes largely to farms in the Central and Middle West regions for use as tractor fuel, for heating incubators and as a stove fuel in homes for the occasional chilly day. It is necessary to go back to 1932 to find a kerosene market following a pattern like that of the present year at this season.

Such furnace oil as could be found was finding ready takers as a result of cold and rainy weather covering large areas. The furnace oil season should have closed a month ago, but it didn't. Refiners, however, began cutting other products. In consequence there is scurrying around now for such occasional cars as are still needed.

Neutrals, bright stocks and steam-refined stocks were steady, with no price changes. Wax was slow.



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The Solvent Refining of Lub Oils With Furfural

By G. R. BRYANT[1], R. E. MANLEY[2] and B. Y. McCARTY[2]
[1]Indian Refining Co., Lawrenceville, Ill. [2]The Texas Co., New York*

The development of the process employing furfural as a selective refining solvent in the manufacture of lubricating oils of improved service characteristics was discussed in a paper presented at the fourteenth annual meeting of the American Petroleum Institute in October, 1933.[1] In this paper it was pointed out that the ideal refining solvent should effect separation of extract without loss of raffinate constituents, should be stable at the maximum distillation temperatures employed in stripping, and should be applicable to even the highest viscosity oils at temperatures high enough to obtain intimate contact and rapid separation of extract and raffinate solutions in a continuous countercurrent application. It was pointed out that the solvent should be available in large quantities at a low cost, and should be relatively non-toxic.

Immediately after the laboratory development had been reported, a commercial plant was completed, and has been in successful commercial operation since December, 1933. This article deals specifically with the commercial application of furfural in the refining of distillate-lubricating stocks derived from Mid-Continent crude.

The original work on furfural refining was covered in U. S. Patent No. 1,550,523, issued to Eichwald.[2] This patent discloses broadly the use of furfural for the purification of hydrocarbon oils. During the year 1931 laboratory work was started to establish the commercial possibility of furfural as a selective refining solvent. This work was continued through 1932 and 1933, and a plant was designed and installed in the refinery of the Indian Refining Co. at Lawrenceville, Ill., being completed on November 8, 1933. The plant has been in practically continuous operation at full capacity since that date. It has handled exclusively distillate oils derived from pipe line Mid-Continent crude by vacuum distillation. The oils have ranged in viscosity from 40 seconds Saybolt at 210° F. up to 180 seconds Saybolt at 210° F. These oils have been solvent-dewaxed with acetone-benzol after furfural refining, and subjected to finishing operations for the production of a suitable color and cast.

*Presented at mid-year meeting of A.P.I., Tulsa, May 16, 1935. Authors' title, "The Refining of Lubricating Oils with Furfural."

TABLE 1—AVERAGE FURFURAL LOSSES
(Plant operating data)

Period—	Total barrels oil treated	Total barrels furfural used	Gallons furfural loss	Per cent furfural loss (basis furfural used)	Gallons furfural lost per barrel of oil charged
3-31-34 to 6-4-34	79,873	152,765	3,243	0.0505	0.0406
6-4-34 to 8-14-34	84,228	159,612	2,589	0.0431	0.0343
8-14-34 to 11-12-34	100,753	212,420	2,251	0.0252	0.0223
Total for period 3-31-34 to 11-12-34	264,854	524,797	8,383	0.0280	0.0316

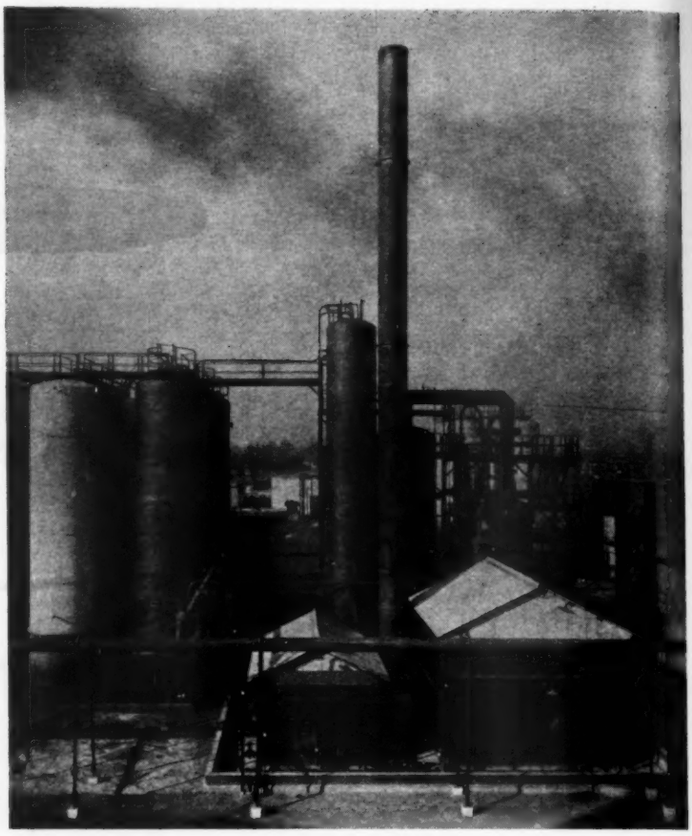

Fig. 2—General view of Furfural refining unit at the Lawrenceville, Ill. plant of the Indian Refining Co.

Description of Plant

Figure 1 is a flow diagram representing the most up to date design of a furfural-refining unit. Photographs of the Lawrenceville installation are shown in Figure 2.

The flow illustrated in Figure 1 has embodied certain features not included in the Lawrenceville plant. The changes to be made in the newer installations have resulted from a more complete study of solvent-recovery and stripping operations, and these changes have not affected the basic principles in any way.

The plant consists of the following main operating units, as shown in the flow sheet:

1. A vertical counter-flow extraction tower with preheaters and exchangers for furfural and charge oil.
2. Extract-stripping unit for two-stage dry distillation of furfural from extract solution followed by steam stripping under vacuum for removal of final traces of solvent.
3. Refined-oil stripping unit for vacuum distillation of furfural from the refined oil solution followed by steam stripping under vacuum for removal of final traces of solvent.
4. A solvent-recovery system for recovery of furfural from water.

The unique feature of this plant is the installation and successful operation of a packed counter-flow extraction tower. The use of a counter-flow extraction tower instead of a large number of stages in step counter-flow has been proved to be advantageous from the standpoint of plant investment in equipment, simplified operation, reduced operating and repair costs.

The high temperatures of application of furfural and the difference in specific gravity between extract and raffinate solutions permit counter-flow operation in a packed tower as well as counter-flow application in multi-stage. Not only are settling rates of furfural in oil very high, but furfural selectivity wets stoneware packing, spreading over the surface of the packing in a thin film, and offering a large surface of contact at the interface between the two liquid phases—thus permitting the two phases to approach equilibrium quickly. The high operating temperatures insure a low viscosity in the oil phase and a low resistance to the attainment of equilibrium.

It should be emphasized that furfural

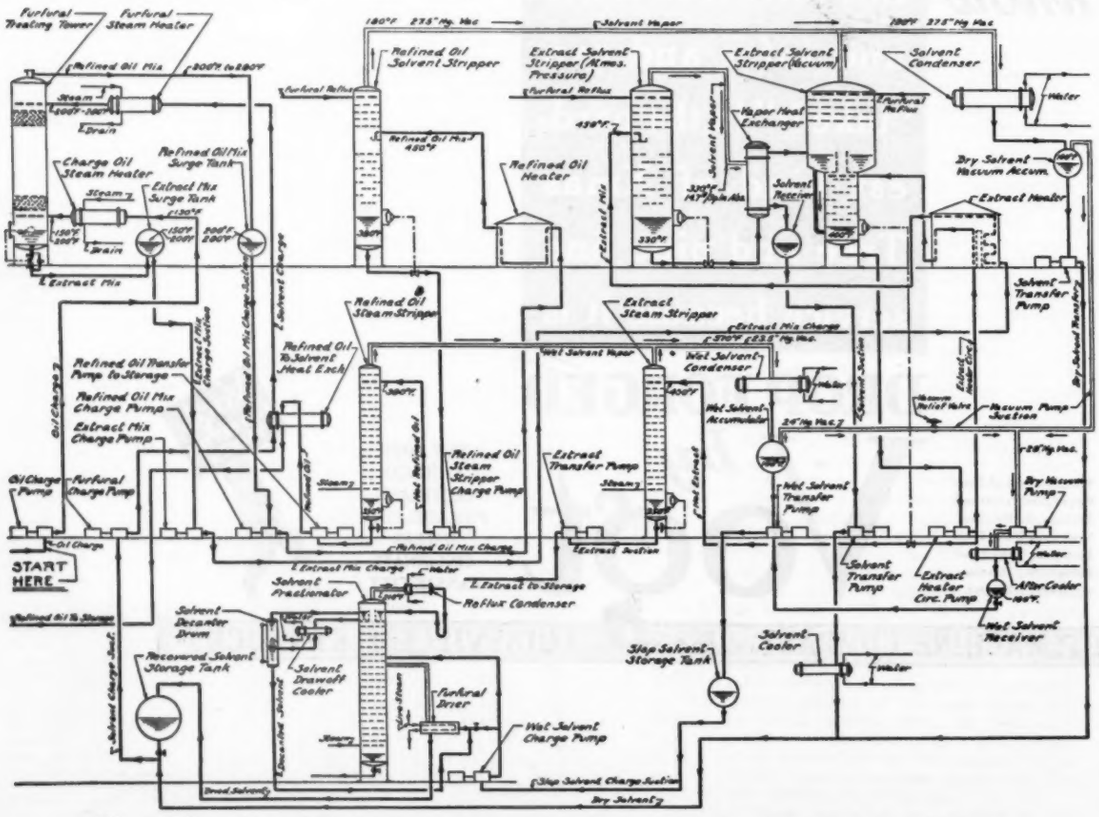

Fig. 1—Flow chart of Furfural solvent extraction plant for the manufacture of lubricating oils

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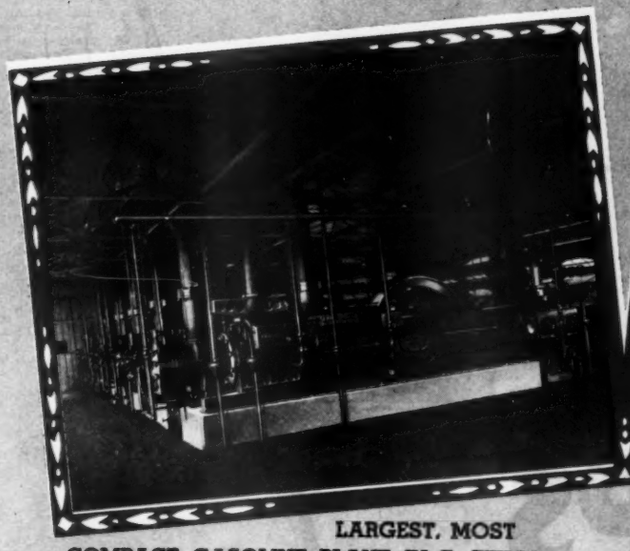

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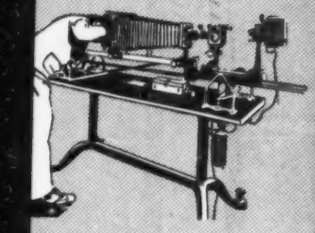

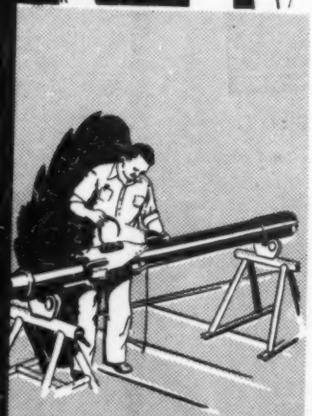

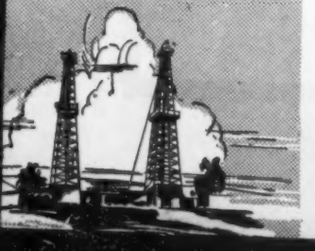

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is equally adaptable to both counter-flow-tower and step-counter-flow operation. Either system may be used—the choice depending upon the economics involved, the flexibility desired, and the likes and dislikes of the individual refiner.

TABLE 2—FURFURAL-REFINING UNIT
(Labor requirements)

Labor—	Hours	Hrly. rate	Daily cost
Operating foreman	4	$1.50	$6.00
Shift foreman	8	1.25	10.00
Operator	24	0.90	21.60
Helper	24	0.75	18.00
Laborer	3	0.55	1.65
Total			$57.25

(Utilities requirements)
Fuel, 0.0443 bbl. of fuel per barrel of charge.
Steam, 151 lbs. per barrel of charge.
Water pumping, 0.943 k.w.h. per barrel of charge.

Average Operating Conditions—Wax Distillate No. 40 Stock	
Oil charged to plant, °F.	120
Temp. of oil charged to counter-flow tower, °F.	195
Temp. of furfural charged to counter-flow tower, °F.	255
Temp. top of tower, °F.	235
Temp. bottom of tower, °F.	200
Ratio of furfural to oil charged by volume	1.97 to 1
Fuel distribution:	
Extract, per cent	77.02
Raffinate, per cent	22.98
Plant charge rate (42-gal. bbls.), bbls. per day	1,330
Furfural loss (average), per cent of furfural used	0.0380

Referring to Figure 1, raw lubricating stock is charged at a constant flow rate to the bottom of the furfural-treating tower through a heater in which temperature is regulated to the desired point. Temperatures range from about 130° F. minimum for low-viscosity or naphthenic oils to 220° F. for the high-viscosity paraffinic oils.

Furfural is charged through a heat exchanger, where heat is recovered from the hot solvent-free refined oil; thence through a live-steam heater, where temperature is regulated to the desired point — for low-viscosity or naphthenic oils about 160° F. minimum, and about 270-280° F. maximum for high-viscosity paraffinic oils.

TABLE 3—OPERATING COSTS—FURFURAL-REFINING UNIT
(Exclusive of royalties)

	Unit cost (basis bbls. of charge)	
Operating labor	$0.0366	
Material, supplies, and others	0.0033	
Fuel	0.0496	
Steam, power, and water	0.0493	
Total operating		$0.1388
Repair labor	0.0020	
Material, supplies and others	0.0026	
Total repairs		0.0046
Furfural loss		0.0305
Total direct expense, per barrel		$0.1739

Temperature gradient has been found to be decidedly advantageous in effecting the desired fractional separation of extract and refined oil; and, in general, it has been found that top-tower temperatures determine quality of refined oil, while bottom-tower temperatures establish yields.

The extraction tower is packed with about 20 feet of raschig rings, with redistribution means at about each 4 feet of packed-tower space. Charge rates should average about 35 gallons of charge oil per hour per square foot of over-all tower cross-sectional area, although rates as high as 70 gallons per square foot per hour have been used without excessive mechanical entrainment of solvent with refined oil.

Provision may be made for external cooling of extract mixture more completely to fractionate refined oil from extract. This may be accomplished by withdrawal of extract mixture through a cooler and re-introduction of the cooled

(Continued on Page 78)

TABLE 5—FURFURAL REFINING FOR HIGH VISCOSITY INDEX
(Pilot-unit operation)

Solvent dosage, per cent by volume	292
Top-tower temperature, °F.	243
Bottom-tower temperature, °F.	229
Yield, per cent raffinate by volume	51.3

Inspection—	Raw charge	Raffinate	Extract	(*) Treated raffinate
Gravity, °A.P.I.	21.5	29.4	13.1	29.6
Flashpoint, Cleveland open cup, °F.	485	480	....	500
Firepoint, Cleveland open cup, °F.	555	570	....	565
Viscosity at 100° F., Saybolt Universal	....	520	....	500
Viscosity at 130° F., Saybolt Universal	444	236	483/160	232
Viscosity at 210° F., Saybolt Universal	80.5	65	128	66
Pourpoint (A.S.T.M.), °F.	—10	—5	....	—5
Color	½ Tag.	30 (½-in. cell) Lovibond	Black	15 (6-in. cell) Lovibond
Carbon residue, per cent	0.69	0.03	1.90	0.02
Viscosity index	52	98	....	103
Viscosity-gravity constant	0.862	0.801	....	0.802

*Finishing treat, 5 lbs. 98 per cent acid per barrel, contact-filtered with 7 lbs. of clay.

TABLE 6—OXIDATION TESTS, FURFURAL-REFINED OILS

	Furfural-refined No. 20	Furfural-refined No. 40
Gravity, °A.P.I.	29.1	27.9
Flashpoint, Cleveland open cup, °F.	435	490
Firepoint, Cleveland open cup, °F.	495	560
Viscosity at 100° F., Saybolt Universal	317	716
Viscosity at 210° F., Saybolt Universal	52.5	72
Viscosity index	89	87
Pourpoint, °F.	—5	—5
Carbon residue, per cent	0.04	0.12
Sligh oxidation No.	0.5	0.80
B.E.S.A. sludge	0.09	0.04
German method tar-forming No.	0.06	0.04
Appearance of heated oil after cooling	Clear transparent red oil	Clear transparent red oil
Sludge insoluble in benzine	none	none
Separation of sludge after heating with sodium hydrate	none	none
Standard Oil Co. (Indiana) oxidation test:[4]		
Hours for 10 mg. sludge per 10 g.	68	105
Hours for 100 mg. sludge per 10 g.	134	153
Test period, hours	166	166
Viscosity at 210° F., Saybolt Universal, after period	65	95

TABLE 4—FURFURAL REFINING MID-CONTINENT DISTILLATES

	Light Mid-Continent distillate	Heavy Mid-Continent distillate	Extra-Heavy Mid-Continent distillate
Dosage furfural in, per cent by volume	191	190	191
Temperature tower top, °F.	200	235	240
Temperature tower bottom, °F.	170	212	220
Yield raffinate, per cent by volume	77.0	72.5	66.5
Yield extract, per cent by volume	23.0	27.5	33.5

Inspection—	Raw charge	Raffinate	Extract	(*) Wax-free product	Raw charge	Raffinate	Extract	(*) Wax-free product	Raw charge	Raffinate	Extract	(*) Wax-free product
Gravity, °A.P.I.	25.6	30.8	11.2	28.6	23.1	28.6	10.7	26.5	20.8	27.1	10.3	26.2
Flashpoint, Cleveland open cup, °F.	440	450	...	450	500	510	...	505	550	550	...	555
Firepoint, Cleveland open cup, °F.	510	510	...	510	580	575	...	580	625	625	...	630
Viscosity at 100° F., Saybolt Universal	...	...	...	298	1,300	650	...	932	5,000	1,220	...	1,697
Viscosity at 130° F., Saybolt Universal	141	110	...	...	...	281	...	...	...	...	...	635
Viscosity at 210° F., Saybolt Universal	50	48	81	52	87	72	247	82	176	162	70 Furol	112
Carbon residue, per cent	0.27	0.03	...	0.04	1.40	0.14	...	0.25	3.70	0.40	...	0.35
Color	...	...	Black	100 (6-in. cell) Lovibond	...	...	...	40 (½-in. cell) Lovibond	Black	...	...	3 Tag.
Pourpoint (A.S.T.M.) °F.	90	100	...	—5	110	115	...	—5	+80	120	...	—5
Viscosity index	72.5	105	...	95	64	97	...	87	54	97	...	85

*Oils are finished with 3 to 7 pounds of acid per barrel contact-filtered and dewaxed by acetone-benzol process.

TABLE 7—PILOT-UNIT RUNS OF TYPICAL STOCKS

Oil source—	Pennsylvania steam-refined residuum
Per cent furfural by volume	276
Temperature top tower, °F.	249
Temperature bottom tower, °F.	232
Per cent raffinate by volume	84.2
Per cent extract by volume	16.8

	Charge	Refined oil	Extract	Contacted refined oil 36 lb. filtrol, per bbl.
Gravity, °A.P.I.	25.1	27.8	12.1	28.2
Flashpoint, Cleveland open cup, °F.	560	550	....	560
Firepoint, Cleveland open cup, °F.	640	640	....	635
Viscosity at 100° F., Saybolt Universal	....	1,790	....	1,900
Viscosity at 130° F., Saybolt Universal	955	750	....	770
Viscosity at 210° F., Saybolt Universal	162	147	....	142
Pourpoint, °F.	35	....	....	45
Carbon residue, per cent	3.06	1.41	....	1.14
Color	Black	Dark green	....	¾ Tag-Robinson
Viscosity index	....	113	....	107
Viscosity-gravity constant	....	0.799	....	0.797

Oil source	Pennsylvania neutral	Gulf Coastal distillate
Per cent furfural by volume	197	206
Temperature top tower, °F.	200	195
Temperature bottom tower, °F.	172	175
Per cent raffinate by volume	86.0	63.3
Per cent extract by volume	14.0	36.7

	Charge	Refined oil	Extract	Refined oil dewaxed	Charge	Refined oil	Extract	Refined oil, contact-filtered
Gravity, °A.P.I.	30.8	33.5	16.7	32.2	18.8	24.0	10.6	24.0
Flashpoint, Cleveland open cup, °F.	420	420	420	425	480	450	460	475
Firepoint, Cleveland open cup, °F.	475	470	475	480	535	525	525	535
Viscosity at 100° F., Saybolt Universal	152	136	705	159	1,810	950	....	915
Viscosity at 210° F., Saybolt Universal	44	44	58.5	82	82	70	152	70.6
Pourpoint, °F.	75	70	50	0	—5	0	....	—5
Carbon residue, per cent	0.06	0.02	0.90	0.02	0.14	0.04	1.10	0.04
Color	....	....	....	200 (6-in. cell) Lovibond	4¾ Tag-Robinson	....	Black	120 (6-in. cell) Lovibond
Viscosity index	104	123	+11	111	—3.5	....	....	52
Viscosity-gravity constant	0.818	0.803	....	0.808	0.881	....	....	0.844
Steam emulsion No.								90
Demulsibility								1,620
Navy emulsion								
Water								40-40-0-4
Brine								40-40-0-15
Caustic								40-40-0-15

Recent Developments in Selective Solvent Extraction With Chlorex

BY D. B. WILLIAMS
Carbide & Chemical Carbon Corp.*

There are now seven commercial Chlorex plants operating, with a combined charging capacity in excess of 6,000 bbls. of oil per day. Below is a list of these plants with the daily charging capacity of each. The Freedom and Bradford Penn installations were recently placed in operation. The other five have been running for some time, and have treated a total of something like 60,000,000 gallons of oil.

The plant operated by Standard at Casper, Wyo., is treating overhead stocks from Salt Creek crude. The units at Wood River, Ill., and Tulsa, Okla., are treating oils from Mid-Continent crude. The other four plants were installed during the past 12 months for refining Pennsylvania oils.

Plant—	Daily oil-charging capacity (42-gallon barrels)
Standard Oil Co. (Indiana), Casper, Wyo.	600
Standard Oil Co. (Indiana), Wood River, Ill	1,000
Mid-Continent Petroleum Corp., Tulsa, Okla.	200
The Pennzoil Co., Oil City, Pa.	1,000
Socony-Vacuum Oil Co., Inc., Olean, N. Y.	1,700
Freedom Oil Works Co., Freedom, Pa.	1,200
Bradford Penn Refining Corp., Clarendon, Pa.	450
Total	6,150

Pennsylvania Region

The Pennzoil Co. placed their Chlorex plant in operation last June. This plant has treated neutrals, bright stocks, and 600-flash steam-refined cylinder stock with unformly good results. In the treatment of cylinder stock and neutrals by The Pennzoil Co., raffinate yields of 90 per cent to 92 per cent, or better, have been secured. They have enjoyed a very considerable improvement in filter yields when finishing cylinder-stock raffinates to bright-stock color specifications. No difficulties have been encountered in dewaxing the wax-bearing raffinate; in fact, they have removed a drier petrolatum stock in the plant centrifuges, using the same chilling temperature and naphtha dilution as formerly on filtered cylinder stock. It is necessary to use a slightly higher water temperature on the centrifuge bowls to facilitate removal of the higher-melting-point wax.

The extraction equipment at Pennzoil is a three-stage counter-current system of mixers and settlers. Mixing is accomplished by orifice-plate pipe mixers. These have proved very efficient as a means of contacting the solvent and oil. Chlorex is now recovered from the extract and raffinate solutions in a pipe still incorporating a vacuum stripper.

The Chlorex plant operated by the Socony-Vacuum Oil Co., Inc., at Olean, N. Y., has a charging capacity of 1,700 bbls. per day. This unit has operated continuously since early last August. The extraction equipment consists of a four-stage counter-current system of settling tanks and mixers. Chlorex is recovered from the raffinate and extract solutions in shell stills which are designed for, and maintained under, a vacuum of 26 inches mercury. Heat for distillation is supplied with closed steam coils using 140 pounds live steam. Each still is also provided with open steam coils to facilitate the stripping operation. Two 400-bbl. stills are used for recovering the solvent from the raffinate solution, and four of the same capacity for the extract solution.

In both the Pennzoil and Socony-Vacuum plants considerable equipment which was available in the refinery, including the distillation equipment in both cases, was utilized in construction. The installations for the Freedom Oil Works Co. and the Bradford Penn Refining Corp. are new from the ground up.

The Freedom unit has a charging capacity of 500 bbls. per day of 600 steam-refined cylinder stock or up to 1,200 bbls. per day of neutral. The solvent is recovered from the extract and raffinate solutions continuously in separate steam-heated stripping columns maintained under a vacuum of 28 inches mercury. Complete removal of the solvent is effected at a maximum stripping temperature of 300° F. In the Bradford Penn Chlorex plant, heat for distillation under a vacuum of 26-28 inches mercury is applied by means of a hot-oil circulating system. The Bradford Penn plant has a capacity of 300 bbls. per day of cylinder stock or 450 bbls. of neutral.

Typical results on a 180 neutral from Pennsylvania crude are shown in Table 1. This distillate was treated with Chlorex in seven-stage continuous counter-current apparatus with a ½-to-1 ratio of Chlorex to oil by volume at a temperature of 65° F.

TABLE 1—DATA ON PENNSYLVANIA NEUTRAL

	Original	Raffinate	Extract
Yield, % by volume	100.0	92.1	7.9
Gravity, ° A.P.I.	30.1	31.5	15.3
Flashpoint, ° F.	425	425	....
Firepoint, ° F.	500	500	....
Pourpoint, ° F.	20	25	....
Color, NPA	3.5	2.5	....
Carbon residue, %	0.03	0.01	....
Sligh oxidation No.	28.4	3.4	....
Saybolt Universal viscosity at 100° F.	179	168	927
Saybolt Universal viscosity at 210° F.	45.8	45.6	62.5
Viscosity index	109.1	117.5	—12.1

A 92.1 per cent yield of oil was obtained, which shows an improvement in viscosity index from 109.1 to 117.5. Increased oxidation resistance is indicated by the reduction in Sligh number, although some feel that this test is more qualitative than quantitative. The laboratory where this extraction was conducted is not yet equipped to run the Indiana oxidation test, which many consider gives a better index of oxidation resistance of an oil than the Sligh test does. The viscosity index of this neutral was increased to 121.2 in another extraction, using the same number of counter-current stages, a higher Chlorex-to-oil ratio (1 to 1), and a higher temperature, 80° F. Under these conditions, improvement in the oxidation resistance, as measured by the Sligh No., was the same. Raffinate yield was slightly lower.

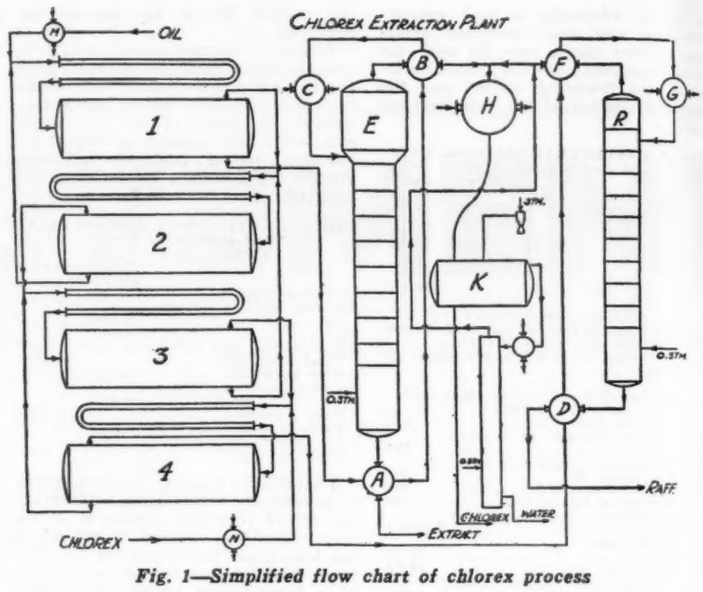

Fig. 1—Simplified flow chart of chlorex process

In considering solvent extraction as applied to Pennsylvania oils, refiners in that region are interested principally in the treatment of steam-refined cylinder stock. By four-stage counter-current treatment of a typical 600 stock, results shown in Table 2 were obtained. The oil was treated at a temperature of 75° F. using a 1.5-to-1 Chlorex-to-oil ratio, by volume.

It will be noted that the extract loss on this stock was only 7 per cent. The extract has a gravity of 10.9 (nearly the same as that of water), a viscosity of 1,445 seconds at 210° F., and a viscosity index of approximately —30. The character of this extract clearly demonstrates the high selectivity of the solvent. By treating this stock with Chlorex, a 93.0 per cent yield of wax-bearing raffinate was obtained, with a reduction in the Conradson carbon residue from 2.07 per cent to 1.40 per cent. When the original stock and raffinate were dewaxed to pourpoints of +25° and +20° F., respectively, and both oils were filtered to an 8 NPA color, it will be noted that the treated bright stock had a carbon residue of 0.91 per cent as compared with 1.44 per cent on the conventionally refined bright stock. At the same time, the percolation yield was increased from 446 gallons per ton to 562 gallons per ton, which represents a considerable saving in filter costs for the same bright stock color. A comparison of the percolation yields when finishing the dewaxed charging stock and the dewaxed raffinate to various NPA colors will be found in Table 3.

TABLE 3—PERCOLATION YIELDS

Stock—	Color (NPA)	Percolation yield (gallons of viscous oil per ton of No. 1 Attapulgus Clay)
Original	6	376
	7	392
	8	446
Raffinate	6	467
	7	490
	8	562

The increased demand for lighter lubricating oils has placed a premium on neutrals. Pennsylvania neutrals are selling for around 28 cents a gallon, while the price of bright stock has dropped to around 16 cents a gallon. This situation is just about the reverse of what it was a year or so ago. When treating a Pennsylvania steam-refined cylinder stock with Chlorex, a reduction in the viscosity at 210° F. of from 10 to 12 seconds is obtained.

This offers two advantages: (1) Starting with a 600-flash cylinder stock with a viscosity of 150 seconds at 210° F., Chlorex treatment makes it possible to finish up a less viscous (140-138 seconds at 210° F.) bright stock. By this reduction in viscosity about 3 per cent to 4 per cent more bright stock will go into motor-oil blends than when refining conventionally by dewaxing and percolating to the same pourpoint and color; because without the solvent the reduction in viscosity at 210° F. is very slight. (2) Starting with a cylinder stock of 160-162 seconds at 210° F., Chlorex extraction by reducing the viscosity will permit finishing up a bright stock of 150-148 at 210° F. When running to the more viscous cylinder stock, some of the viscous oil which normally goes into the bright stock is taken into a slop wax cut, which may be dewaxed with propane or thermally treated to permit filter pressing for wax removal. It has been estimated by several Pennsylvania refiners that, taking all factors into consideration, the latter method described above will show an increase in neutral production of 2 per cent to 2½ per cent, based on the crude, or 17 per cent to 20 per cent, based on neutral, and a decrease in bright stock production of about 2½ per cent to 3 per cent, based on the crude, or 15 per cent to 20 per cent, based on bright stock.

Many Pennsylvania refiners feel that viscosity reduction of cylinder stocks by solvent means will pay for the cost of extraction and also compensate for extract losses which are sustained in solvent treating. Considering this, and the

TABLE 2—DATA ON PENNSYLVANIA STEAM-REFINED CYLINDER STOCK

	Original charging stock—			Raffinate—			Extract
	Wax-bearing	Dewaxed	Finished	Wax-bearing	Dewaxed	Finished	from original
Yield, % volume	100	....	....	93.0	....	....	7.0
Gravity, ° A.P.I.	26.9	26.6	27.2	28.1	27.8	28.2	10.9
Flashpoint, ° F.	590	585	585	585	580	580	....
Pourpoint, ° F.	50	30	25	55	25	20	....
Carbon residue, %	2.07	1.90	1.44	1.40	1.33	0.91	....
Color, true	1,500	1,700	333	1,100	1,190	260	....
Color, NPA	....	....	8	....	....	8	....
Acidity	0.56	0.12	0.10	0.39	0.07	0.06	....
Viscosity at 210° F.*	161.2	173	159.9	160.9	161.8	152.4	1,445
Viscosity at 130° F.*	887	....	....	784	....	....	....
Viscosity at 100° F.*	2,231	2,695	2,338	1,908	2,272	2,083	....
Viscosity index	109	104.5	105.5	112.0	108.3	108.5	—30
Viscosity-gravity constant.	0.804	0.805	0.802	0.796	0.797	0.795	approx. 0.907

*Kinematic viscosity converted to Saybolt seconds by means of A.S.T.M. equations.

*Presented at Mid-Year Meeting, A.P.I. Tulsa.

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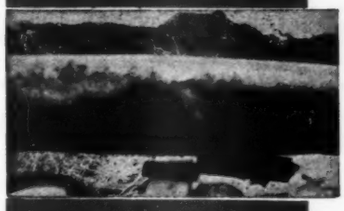

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increase in percolation yields obtained, Chlorex extraction of Pennsylvania oils should not increase refining costs, and may show some savings. Profitable disposal of extracts is being closely studied, and applications in certain directions offer promise.

With regard to improvement in oxidation resistance, conventionally refined Pennsylvania SAE-20 and 30 motor oils will generally show about 50 to 55 hours for 10 mg. of sludge on the Indiana oxidation test. A number of oxidation tests have been run on SAE-20 and 30 blends made up of Chlorex-treated neutral and bright stock. All of these have shown better than 200 hours on the Indiana test with no sludge formation.

Treatment of Mid-Continent and Coastal Oils

Chlorex is peculiarly well suited to the treatment of overhead stocks from Mid-Continent and Coastal crudes. Results obtained with Chlorex on a typical SAE-20 Mid-Continent distillate, dewaxed to a 25° F. pourpoint, are shown in Table 4. This oil was treated in six-stage, continuous, counter-current extraction equipment at a temperature of 60° F., using a 1.44-to-1 Chlorex-to-oil ratio.

TABLE 4—DATA ON MID-CONTINENT DISTILLATE

	Original	Raffinate
Yield, % by volume	100	71.5
Gravity, ° A.P.I.	24.0	30.0
Saybolt Universal viscosity at 210° F.	52.7	49.9
Saybolt Universal viscosity at 100° F.	348.1	267.8
Viscosity index	60.5	92.5
Viscosity-gravity constant	0.853	0.815
Color, NPA	....	4½ to 5
Color, true	331	50
Pourpoint, ° F.	25	30
Carbon residue, %	0.17	0.02
Emulsion test in 1 hour	2 cc.	OK
Neutralization No.	0.36	0.14

A very marked improvement in the color has been effected by the action of Chlorex alone. The stock came direct from the still, and received no acid or clay treatment prior to Chlorex extraction. A 71.5 per cent yield of raffinate was obtained, showing an improvement in viscosity index from 60.5 to 92.5. With a 63 per cent yield, a viscosity index of 100 was readily obtained on this oil.

The raffinate was finished to a 3½-4 color with a clay yield of 4,000 gallons per ton of No. 1 Attapulgus clay.

When treating distillates from Coastal crudes, low yields must be expected if a 100-VI oil is desired. For this reason, a moderate improvement in viscosity index appears more logical. Table 5 shows results obtained with Chlorex on overhead distillate blend from Coastal crude. This extraction was run seven-stage, batch, counter-current, at a temperature of 60° F. using a 1½-to-1 Chlorex-to-oil ratio.

Viscosity Index Improvement

With a 64.8 per cent raffinate yield a viscosity index improvement from 21 on the original stock to 65.5 on the raffinate was obtained. The raffinate was finished to a 2½ NPA color, with a percolation yield of 5,900 gallons per ton of No. 1 Attapulgus clay. Chlorex extraction of this stock is accompanied by improvement in other properties, such as steam-emulsion number, demulsibility, and acidity.

Several of the refiners in the Mid-Continent Field are considering installation of a Chlorex plant to treat Mid-Continent neutrals and possibly bright stock. On a Mid-Continent neutral, a viscosity index of 100, or better, can be readily obtained with Chlorex, with yields from 60 per cent to 75 per cent. Acid treatment will not be necessary, and solvent treatment should show real savings in clay costs. Assuming that such a neutral were available, motor oil blends could be made with this neutral and: (1) 150-viscosity Mid-Continent bright stock finished conventionally with acid and clay, or (2) the same bright stock which has been treated with Chlorex with a moderate extract loss of, say, 12½ per cent.

In order to study these possibilities, two series of motor oil blends, SAE-20 to SAE-50, inclusive, have been prepared. The same neutral, a typical Chlorex-treated Mid-Continent distillate of 102 VI was used in both series. Tests of this neutral and the Chlorex-treated and untreated bright stocks are given in Table 6.

The data in Table 6 show that Chlorex treatment of the conventionally refined Mid-Continent bright stock has resulted in a reduction in Conradson carbon residue from 1.79 per cent to 1.11 per cent on the treated oil. There is no increase in pourpoint. The viscosity index has been increased from 80 to 89.

Inspections on motor oil blends, secured by blending the Chlorex-treated neutral with the conventionally refined Mid-Continent bright stock, are given in Table 7.

The viscosity index of the SAE-20 oil in Table 7 is better than 100, while the viscosity index of the SAE-30 oil is

TABLE 5—DATA ON DISTILLATE BLEND FROM COASTAL CRUDE

	Original	Raffinate before claying	Raffinate finished	Extract
Yield, % by volume	100	64.8	....	35.2
Gravity, ° A.P.I.	20.4	25.0	25.0	11.9
Color, true	85	34	7	....
Color, NPA	....	4½	2½	....
Pourpoint, ° F.	—10	—5	0	....
Carbon residue, per cent	0.16	0.02	0.01	....
Saybolt Universal viscosity at 210° F.	61	59.9	60.2	93.8
Saybolt Universal viscosity at 100° F.	741	544	550	....
Viscosity index	21	65.5	67	....
Viscosity-gravity constant	0.875	0.840	0.839	0.937

TABLE 6—DATA ON MID-CONTINENT NEUTRAL AND BRIGHT STOCKS

	Neutral*	Bright stock	Treated bright stock (87.5 per cent yield)
Gravity, ° A.P.I.	31.1	23.2	25.4
Flashpoint, ° F.	430	555	560
Firepoint, ° F.	490	635	640
Pourpoint, ° F.	5	5	5
Color, Tag-Robinson	....	1	1 1/16
Color, NPA	2½	....	....
Color, ASTM	2—	4— dilute	4— dilute
Carbon residue, per cent	0.018	1.79	1.11
Saybolt Universal viscosity at 100° F.	211	3,512	2,609
Saybolt Universal viscosity at 130° F.	†110	....	....
Saybolt Universal viscosity at 210° F.	47.5	162.5	145.9
Viscosity index	102	80	89

*Contains 0.1 per cent paraflow. †A.S.T.M. chart.

TABLE 7—BLEND OF CHLOREX-TREATED NEUTRAL AND CONVENTIONALLY REFINED BRIGHT STOCK

	SAE-20	SAE-30	SAE-40	SAE-50
Neujtral, % by volume	93	73	59	43
Gravity, ° A.P.I.	30.4	28.9	27.9	26.6
Flashpoint, ° F.	435	455	465	475
Firepoint, ° F.	500	515	525	540
Pourpoint, ° F.	5	5	5	5
Color, ASTM	3.5	5—	6—	6
Carbon residue, per cent	0.10	0.42	0.74	1.0
Saybolt Universal viscosity at 100° F.	248	405	593	914
Saybolt Universal viscosity at 130° F.	129	196	269	*370
Saybolt Universal viscosity at 210° F.	49.6	58.3	67.4	81.0
Viscosity index	101	97	93	88
Sligh No.	2.7	2.5	1.5	1.0

*From A.S.T.M. chart.

slightly under 100. There is a progressive improvement in the oxidation resistance of these oils, as measured by the Sligh test, which is to be expected as the amount of bright stock in each blend increases.

Viscosity Indices

The viscosity indices in Table 7 were calculated from the Saybolt Universal viscosities of these oils. If these figures had been based on the kinematic viscosities, it is probable that the viscosity indices would have been somewhat lower. Although many feel that viscosimeters for measuring kinematic viscosities give more accurate results than the Saybolt instrument, particularly on the lighter oils, it is, nevertheless, true that the Saybolt viscosimeter is in very general use throughout the country, and Saybolt viscosities are still generally used in reporting oil specifications. Further improvement in the viscosity index of the oil in Table 7 can be secured by the addition of Paratone to the bright stock used in the blends.

Inspections on a series of motor oils made by blending Chlorex-treated Mid-Continent neutral with the 150 bright stock after treatment with Chlorex, with a 12½ per cent loss, are shown in Table 8.

It will be noted that the SAE-20 and SAE-30 oils both have a viscosity index of better than 100, while the SAE-40 oil has the same viscosity index as the SAE-30 oil in Table 7. As a result of the increased demand for lighter oils, it appears that the bulk of the demand for motor oils will be supplied with SAE-30 grade, or lighter. Table 8 shows that oils of 100 viscosity index, or better, to meet this demand can be made by blending a Chlorex-treated Mid-Continent neutral with a conventionally refined Mid-Continent bright stock, also treated with Chlorex with a low extract loss.

Also of interest is the improvement in Conradson carbon residue which has been obtained by blending the neutral with the Chlorex-treated rather than the conventionally refined bright stock. The carbon residues in Table 8 are approximately half those in Table 7. Further improvement in resistance to oxidation, as measused by the Sligh No., has been obtained by treating both blending stocks with Chlorex.

Mid-Continent Long Residuum

Although Chlorex shows a very marked improvement, with low extract losses, on residual stocks from Pennsylvania crude, when extracting a Mid-Continent long residuum, which may contain from 5 per cent to 15 per cent asphalt and other undesirable constituents, it is usually necessary to acid-treat the stock or de-asphalt it in propane before solvent extraction. Typical results obtained on a propane-de-asphalted Oklahoma City long residuum with Chlorex are given in Table 9. The de-asphalted stock was treated in seven-stage, batch, counter-current equipment at a temperature of 80°F. with a 2-to-1 Chlorex-to-oil ratio by volume.

This same stock was extracted with Chlorex after acid treating with 1 pound of acid per gallon, under the following conditions:

Chlorex-oil ratio.....2 to 1
Extraction temperature.....100° F.
Method—four-stage, batch, counter-current.

The yields secured are given in Table 10, and it will be noted that there is some sacrifice in yield when using acid instead of propane for de-asphalting—although the physical properties of the finished oil were equally good. In acid treating, however, no additional investment is required for equipment, as the present acid-treating plant may be used for this preliminary step—thus eliminating the investment required for a propane de-asphalting plant.

As a matter of interest, a Mid-Continent long residuum, conventionally refined by acid treatment, by centrifugal dewaxing, and by percolation, was treated in seven-stage, continuous, counter-current apparatus at a temperature of 105° F., using a 3-to-1 Chlorex-to-oil ratio. The results are given in Table 11.

A 72.4 per cent yield of 99.2-VI oil was secured. This extraction was run simply to determine what loss would be encountered in making a 100-VI oil from an 80 to 85-VI conventionally refined Mid-Continent stock of this kind. By the use of a vacuum still, those refiners who are running a long residuum can take their lubricating stocks overhead from the topped crude. This method of refining will provide greater flexibility in controlling neutral and bright stock production to meet changing marketing conditions, and the overhead stocks will be clean and relatively free from asphaltic materials—and may be readily solvent-extracted with a single solvent, such as Chlorex. The Chlorex process may be installed and operated at surprisingly low cost.

Extraction Equipment

Figure 1 is a typical flow diagram of a Chlorex plant using the latest design of extraction equipment and vacuum distillation for continuous recovery of the solvent from the raffinate and extract solutions. Operation is as follows:

The charge oil is pumped through a heat exchanger M, which is operated either as a cooler or heater, depending on whether water or steam is circulated through the unit. Chlorex-extraction temperatures range from 60° to 125° F., depending on the stock and the results desired. The rate of pumping of the charge oil is under automatic flow control. The pre-heated or pre-cooled oil is mixed in the first-stage pipe mixer, with the extract solution (thrice-used Chlorex) from the second stage. This mixture then settles in the first-stage settling tank. The extract solution from the first-stage settler is pumped, under automatic float control, to the extract-solution distillation unit for continuous recovery of the solvent. The raffinate solution from the first stage flows under first-stage pressure, and is mixed in the second-stage pipe mixer with the extract solution from the third stage. This mixture settles in the second-stage settling tank. The raffinate solution from the second-stage settler is mixed with the extract solution from the fourth stage (once-used Chlorex) in the third-stage pipe mixer, and this mixture settles in the third-stage settling tank. The raffinate solution from the third-stage settling tank is mixed with fresh Chlorex in the fourth-stage pipe mixer. This mixture settles in the fourth-stage settling tank. The final raffinate solution, from the fourth stage, is pumped under automatic control to the raffinate-solution distillation unit for continuous recovery of the solvent.

Figure 1 illustrates a design for four-stage counter-current operation. There does not appear to be any advantage in going to more stages when treating overhead or residual stocks from Pennsylvania crude. However, when treating Mid-Continent and Coastal oils, it is usually desirable to use five, six, or even seven stages. When using more stages, the operation of the extraction equipment is the same as described above.

Installing Extraction Unit

A compact extraction unit is made by installing the horizontal settling tanks one above the other in structural steel framework. The first (top) stage is maintained under the highest pressure, varying from 75 to 100 pounds per square inch. The pressure drops in increments of 10 pounds to 15 pounds per stage as the raffinate solutions flow downward from stage to stage, while the extract solutions are pumped with float-controlled pumps in the opposite direction. Chlorex is charged to the system with an automatically controlled pump through a heat exchanger, N, through which either water or steam may be circulated for heating or cooling the solvent.

The solvent recovery system is maintained under a vacuum of 26 inches to 28 inches mercury, and the solvent is completely recovered from the oil at a maximum stripping temperature of 300° to 325° F. The distillation equipment shown in Figure 1 is steam-heated. Direct-fired vacuum distillation units are also being used successfully for recover-

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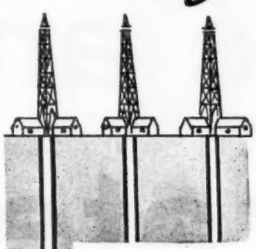

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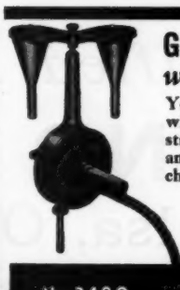

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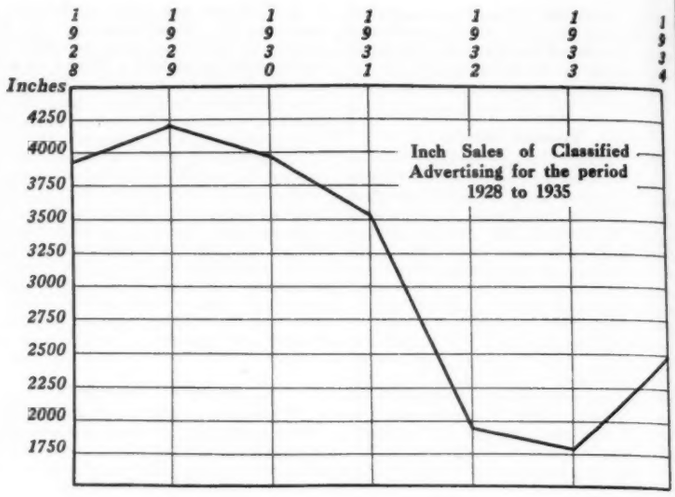

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ing Chlorex, and the choice of equipment depends to a large degree on whether sufficient live steam is available in the refinery to operate the unit.

Utilizing Heat

The final extract solution from the first-stage settling tank passes through a heat exchanger, A, utilizing the heat in the stripped bottoms from the extract-distillation unit, E. Further heat is supplied to the extract solution in a second heat exchanger, B, utilizing the heat in the hot Chlorex water vapors from the extract unit. Any additional heat required for distillation is supplied with a steam pre-heater, C. The extract solution enters the stripping column near the top. Open steam is applied at the bottom of the column. Re-boiler coils may be used to maintain the temperature throughout the column, which is a simple fractionating column with bubble trays.

The final raffinate solution from the fourth stage is heated with bottoms and vapor heat exchangers, D, and F, and a steam pre-heater, G. As the raffinate solution will contain only 15 per cent to 25 per cent solvent, the raffinate-stripping unit, R, is considerably smaller than the extract unit, E, where the bulk of the solvent is recovered. Hot Chlorex water vapors from the extract and raffinate-solution distillation units pass through a water-cooled condenser, H—the condensed Chlorex and water flowing to a settling tank, K, where the solvent is separated from the water by gravity and returned to storage for re-use. The water will be saturated with Chlorex with a solvent content of approximately 1 per cent. This water is fed through a pre-heater to a small. packed column, which may be readily constructed from a piece of casing of the proper length and diameter. Open steam is added near the bottom of this column. Water which is completely denuded of Chlorex flows to the sewer under automatic float control from the bottom of this tower, while the vapors which are rich in Chlorex pass to the raffinate-extract vapor condenser, H. A vacuum is maintained on the system by meaus of a steam jet vacuum pump. It is not necessary to operate the water-stripping column under a vacuum. A Chlorex plant of this design, for treating 1,000 bbls. of oil per day, will require a total ground space not over 50 feet square. From 15,000 gallons to 20,000 gallons of solvent is adequate to place such a plant in operation.

Four Chlorex plants using stills already available in the refinery for recovering the solvent were built at an out-of-pocket cost averaging $41 per barrel of combined charging capacity. A 1,000-bbl. per day plant using distillation equipment of this type could, therefore, be installed for around $40,000. Five hundred barrel per day plants built new from the ground up, incorporating continuous vacuum-distillation equipment for recovering the solvent, may be installed at a price range from $120 to $180 per barrel charging capacity; while a 1,000-bbl. per day plant can be built for between $80 and $110 per barrel charging capacity. Operating costs in plants with continuous vacuum-distillation equipment will run from 0.4 cents to 0.5 cents per gallon of oil charged, which includes steam, water, electricity, fuel, Chlorex loss, maintenance, depreciation and labor.

Acknowledgment

The author wishes to express appreciation to the Standard Oil Co. (Indiana), especially to F. F. Diwoky, and to the Mid-Continent Petroleum Corp. for the experimental extractions reported herein, and for helpful criticisms and suggestions during the preparation of the manuscript, and to the Socony-Vacuum Oil Co., Inc., the Pennzoil Co., Freedom Oil Works Co., and the Bradford Penn Refining Corp. for permitting publication of certain details regarding their Chlorex plant installations.

TABLE 8—BLENDS OF CHLOREX-TREATED NEUTRAL AND BRIGHT STOCKS

	SAE-20	SAE-30	SAE-40	SAE-50
Neutral, % by volume	93	71	54	40
Gravity, ° A.P.I.	30.7	29.4	28.5	27.7
Flashpoint, ° F.	435	455	465	475
Firepoint, ° F.	500	515	525	540
Pourpoint, ° F.	5	5	5	5
Color, ASTM	3.5	5—	6—	6
Carbon residue, per cent	0.07	0.28	0.42	0.56
Saybolt Universal viscosity at 100° F.	244	394	594	849
Saybolt Universal viscosity at 130° F.	129	194	271	*355
Saybolt Universal viscosity at 210° F.	49.5	58.5	68.5	80.9
Viscosity index	102	102	97	95
Sligh No.	1.5	1.3	0.6	0.6

*From A.S.T.M. chart.

TABLE 9—DATA ON OKLAHOMA CITY LONG RESIDUUM

	Original wax-bearing stock	Original stock de-asphalted (dewaxed only)	Raffinate from de-asphalted and dewaxed stock	Finished raffinate*	Extract from de-asphalted and dewaxed stock
Yield, % by volume	100	76.2	58.0	98	42
Over-all yield, %	100	76.2	44.2	43.6	....
Gravity, ° A.P.I.	19.9	20.7	26.3	27.7	11.8
Saybolt Universal viscosity at 210° F.	141	128.5	113.6	92.2	235
Saybolt Universay viscosity at 100° F.	3,180	2,709	1,581	1,050	....
Viscosity index	68.5	65.5	94.6	98.4	—78
Viscosity-gravity constant	0.861	0.856	0.816	0.809	approximate 0.922
Color, true	10,100	2,000	1,650	25	....
Color, NPA	....	....	....	3½ to 4	....
Pourpoint, ° F.	75	0	5	5	....
Neutralization No.	0.16	0.15	0.15	0.14	....
Carbon residue, %	5.93	3.22	1.53	0.34	....

*Raffinate percolated through No. 1 Attapulgus clay.

TABLE 10—DATA ON OKLAHOMA LONG RESIDUUM

	Original wax-bearing stock	Original wax-bearing stock acid-treated	Raffinate from acid-treated stock	Dewaxed raffinate	Percolated dewaxed raffinate*
Yield, % by volume	100	69.2	65.7	75	95
Over-all yield, %	100	69.2	46.4	34.8	33.0

*Percolated to 4-4½ NPA color.

TABLE 11—DATA ON MID-CONTINENT RESIDUUM

	Original oil	Raffinate	Contacted raffinate	Extract
Contact clay, gallons per ton	....	....	8,000	....
Yield, % by volume	100	72.4	....	27.6
Gravity, ° A.P.I.	25.0	28.4	28.5	16.7
Viscosity-gravity constant	0.828	0.802	0.802	0.893
Flashpoint, ° F.	470	480	480	460
Firepoint, ° F.	545	560	560	530
Pourpoint, ° F.	5	5	5	10
Color, Tag-Robinson	1¾	1 15/16	1 15/16	¼
Carbon residue, per cent	1.15	0.59	0.57	2.80
Saybolt Universal viscosity at 100° F.	1,237	1,103	1,112	2,792
Saybolt Universal viscosity at 210° F.	91.6	94.9	95.2	105.7
Viscosity index	81.9	98.7	99.2	10.8

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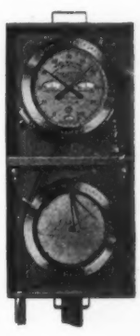

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Chemical Constituents of Gasoline Separated in A. P. I. Project

By FREDERICK D. ROSSINI*

The system of separating petroleum into its constituents which has resulted from the work of A.P.I. Research Project 6 may be described briefly as the systematic interlocking, combination, and variation of all the feasible methods of fractionation. The resolution of the naphtha fraction into its component hydrocarbons has involved working in virgin fields, with no precedents to follow. But now that the paths are in general rather well defined, the entry into this new territory can be made with considerable directness of purpose and assurance of profit. The means which enable one to reach this goal are the physico-chemical fractionating tools of distillation, crystallization, adsorption, etxraction, and carefully-controlled chemical treatment, together with appropriate variations and combinations of these.

However, these methods of fractionation are not new to the petroleum industry, which has been using them in one form or another for many years: Distillation has been the prime method of fractionating petroleum; crystallization has been used to remove paraffin-type hydrocarbons from lubricating stock in the dewaxing process; adsorption has been used in the refining of distillates and residuals by the use of clays, fuller's earth, etc.; and extraction has come into great prominence in the industry in the improvement of the quality of lubricating oils by treatment with solvents.

Fractionation Methods

The contributions of Project 6 to the problem of fractionation may be said to be in the field of refinement, improvement, and variation of the different methods of separation, and the systematic interlocking of them to solve particular problems. For example, the variations in the different general methods of fractionation include:

1. Distillation: (a) Alteration of pressure (760 to 0.0001 mm. mercury); (b) addition of another substance.

Alteration of the pressure permits fractionation of an azeotropic (minimum or maximum boiling) mixture because the composition of the latter changes with pressure. Distillation at reduced pressure is also necessary in the case of those substances which tend to decompose at their normal boiling point.

Distillation in the presence of an appropriate added substance, such as alcohol or acetic acid, permits fractionation of a constant boiling mixture; because the added substance forms an azeotropic (minimum or maximum boiling) mixture with one or more of the components.

2. Crystallization: (a) Simple refrigeration; (b) refrigeration in an appropriate solvent.

Simple refrigeration is usually successful when the wanted component is present in the given fraction in large amount and when it has a not too low freezing point. Mixtures of large unsymmetrical molecules having a low freezing point usually become very viscous before the freezing point is reached, and in these cases simple refrigeration results in glassy solid mixtures.

Refrigeration with an appropriate solvent permits crystallization of the wanted component by increasing its mobility in the liquid state at the temperature of crystallization.

3. Adsorption: Variations in this method of fractionation are obtained by using different adsorbent materials, which differ in selectivity and capacity.

4. Extraction: Variations in fractionating by extraction are obtained by using different solvents which have selective solubilities for the various components of the mixture.

The simple process of fractional distillation has itself been remarkably improved in the past decade. Liquids which were formerly considered inseparable by distillation are now easily separated in efficient rectifying columns. This is important to the present problem; because, with few exceptions, the first fractionating tool to be used on any crude cut is that of efficient distillation, whereby the fraction is separated into a series of substantially constant-boiling fractions.

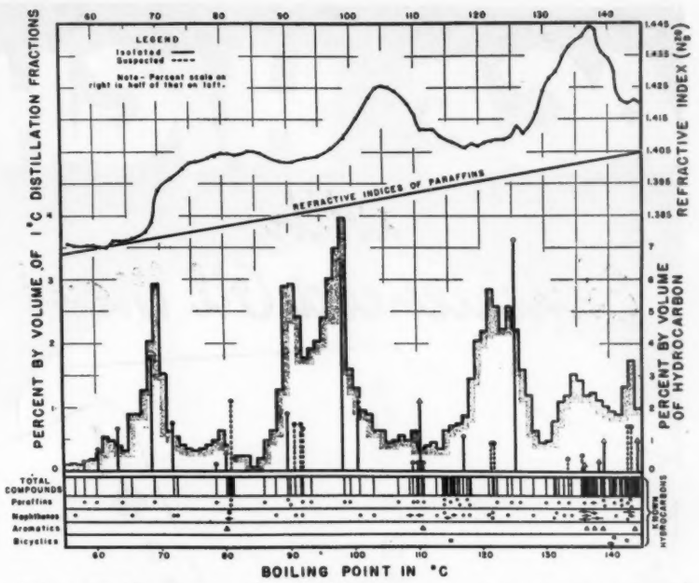


Fig. 1—Volume-temperature distillation curve of the fraction 55-145 deg. C. before removal of any constituents, showing all the known possible hydrocarbons boiling within the temperature range

Distillation at pressures below atmospheric is, in certain cases, advantageous in separating two components. For example, there is evidence that the vapor pressure—temperature curves of a paraffin and a naphthene normally boiling near the same temperature cross each other, so that in a certain pressure range the paraffin is more volatile than the naphthene, while in another pressure range the naphthene is the more volatile.

Examples of the utility of adding appropriate other substances in order to break up, by distillation, an otherwise constant boiling fraction are: (a) The use of methyl or ethyl alcohol in separating the abnormal mixture of hexane and benzene, which cannot be completely separated by simple distillation; and (b) the use of glacial acetic acid in separating an ideal solution of a paraffin and a naphthene normally boiling near the same temperature. The latter method is useful for separating the appropriate hydrocarbons boiling in the range from about 100 to 180° C.

Crystallization by simple refrigeration is especially useful in separating some of the normal paraffins which have been previously concentrated into given cuts by distillation. The usual method here is that of equilibrium melting where the entire cut is first solidified and thoroughly mixed to secure homogeneity; and then, as the temperature is raised, most of the impurities are centrifuged off as a liquid from the more or less pure crystals of the wanted hydrocarbon. It is possible to obtain hydrocarbons of a very high degree of purity by this method.

When the given cut contains no one hydrocarbon in large amount, and when the freezing point is low, the fraction will usually solidify to a glass on cooling—and the method of crystallization from a solvent must be used. For this purpose it is necessary to select a suitable liquid solvent which itself does not freeze at the given temperature. Liquid methane, ethane, propane, the halogenated methanes, and methyl and ethyl ether can be used advantageously as solvents which will permit crystallization of a hydrocarbon which cannot otherwise be crystallized because of its viscous nature at the freezing temperature.

In the method of fractionation by extraction an appropriate liquid solvent is selected in which the constituents of the given petroleum fraction will distribute themselves in proportions other than those which they have in the fraction itself. For example, aromatic hydrocarbons are more soluble in liquid sulphur dioxide than are the paraffins and naphthenes, and this method becomes extremely useful in removing the aromatic hydrocarbons from the other types.

The use of the method of adsorption in fractionating hydrocarbons is a more recent development in the work of the project. By means of adsorption with silica gel, it has been found possible to remove effectively the aromatic constituents from a given fraction. Because the capacity of the gel in this regard is small, being about 1 g. of aromatic hydrocarbon per 10 g. of silica gel, this method has its greatest utility in completely stripping a given fraction of its aromatic constituents after the main bulk of the latter has been removed with sulphur dioxide. It is also possible to effect a small but significant separation of naphthenic from paraffinic hydrocarbons by meanse of adsorption with silica gel.

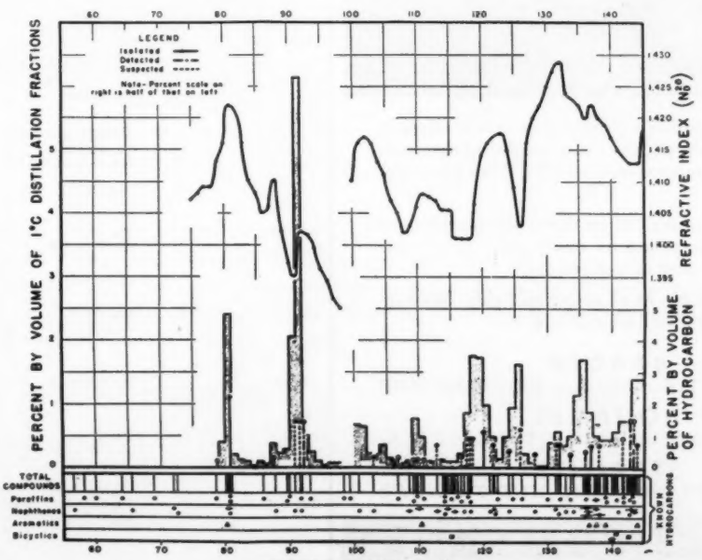


Fig. 2—Composite chart giving the volume-temperature distillation curve after the removal of certain constituents

Analysis of the Constitution of the Naphtha Fraction

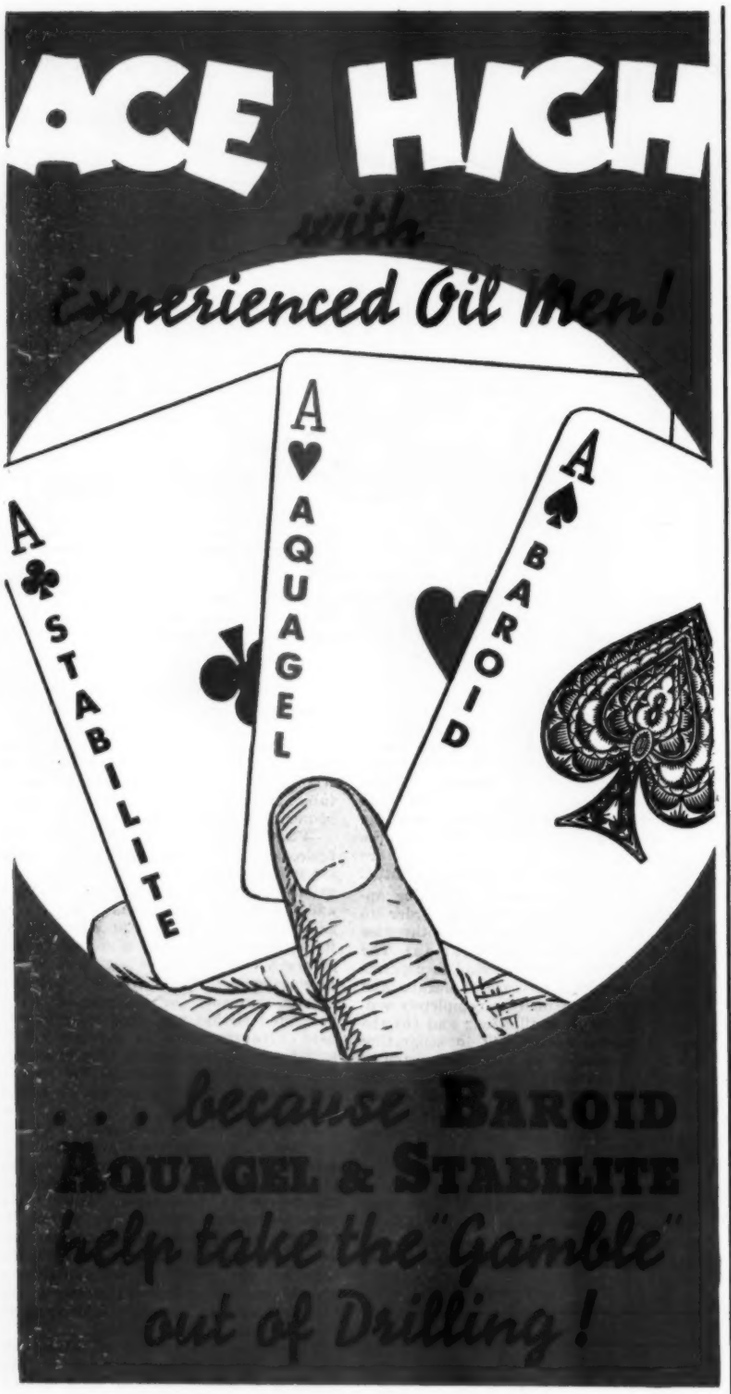
It is the main purpose of this paper to give a summary of all the information which Research Project 6 has obtained to date on the chemical constitution of the naphtha fraction of the Mid-Continent petroleum which has been under investigation. Leslie and White have just completed a critical study and analysis of all the data obtained by the entire project on the gasoline fraction of

*National Bureau of Standards, Washington, D. C.; director, Amer. Pet. Inst. Research Project 6.

The author is indebted to M. R. Fenske, R. T. Leslie and J. D. White for aid in preparing this paper.

Publication approved by the director of the National Bureau of Standards, U. S. Department of Commerce. Author's title, "The Chemical Constitution of the Gasoline Fraction of Petroleum, A.P.I. Research Project 6."

Presented at A.P.I. mid-year meeting, Tulsa, May 15, 1935.



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this petroleum, and the information contained in their report is displayed graphically in the accompanying figures and tables.

One thousand gallons of the selected Mid-Continent crude oil was supplied to the project by the Marland Oil Co. from its No. 6 well in the South Ponca Field, Kay County, Oklahoma. This oil was first distilled in a semicommercial column by the Sun Oil Co. Then, in the laboratory of the project at the National Bureau of Standards, the naphtha fraction was distilled in a 15-liter metal still provided with a 20-plate column, and subsequently in 30-plate all-glass rectifying stills. The naphtha fraction was now fractionated into cuts of nearly constant boiling point, and separation by distillation was no longer practicable.

The Fraction 55-145° C.

In Figure 1 is shown the volume-temperature relation of the fraction boiling between 55° and 145° C. at the end of the first series of distillations, before the removal of any of the constituents. The oil in this fraction, which constitutes about one-seventh of the original crude, was distributed chiefly in four temperature ranges: 10 per cent in the range from 65° to 70° C., 30 per cent from 90° to 100° C., 25 per cent from 115° to 130° C., and 15 per cent from 130° to 145° C. The curve in the upper part of the figure gives the refractive indices of the various cuts. Each constant-boiling cut which cannot practicably be further separated by distillation may consist of: (a) A substantially pure substance; (b) an ideal solution of two or more hydrocarbons whose boiling points normally lie quite close together; or (c) an azeotropic (minimum or maximum-boiling) mixture of two or more hydrocarbons.

In order to fractionate these practically constant-boiling cuts, a variation in the method of distillation, some form of crystallization, extraction, adsorption, or carefully-controlled chemical treatment, or any combination of these, was used. Thus, in case (a), which is rarely encountered in actual practice, the wanted constituent was separated from its impurities, and in cases (b) and (c) one or more of the components were removed. Subsequent to this separation, straight distillation in highly efficient stills was again used, and a new set of

TABLE 1—ANALYSIS OF FIGURE 1

Constant-boiling fraction: Approx. boiling range (°C.)	Class	Types of constituents	Names of chief constituents	Method of separation or detection§
58-65 ..... (Resolved into three fractions by further distillation)	(*)	Paraffinic	2, 3-Dimethylbutane 2-Methylpentane 3-Methylpentane	Distillation. Distillation. Distillation.
65-71	(‡)	Paraffinic Naphthenic Aromatic	n-Hexane Methylcyclopentane Benzene	Distillation with methyl and ethyl alcohol, nitration followed by crystallization.
76-81	(†)	Paraffinic Naphthenic Aromatic	2, 2-Dimethylpentane Cyclohexane Benzene	Nitration followed by crystallization.
85-92	(†)	Paraffinic Naphthenic	2-Methylhexane 3-Methylhexane 1, 2-Dimethylcyclopentane 1, 3-Dimethylcyclopentane	Crystallization with solvent. Suspected from R. I. curve.
95-101	(‡)	Paraffinic Naphthenic Aromatic	n-Heptane Methylcyclohexane Toluene	Nitration followed by distillation and crystallization.
107-110	(†)	Paraffinic Aromatic	2, 5-Dimethylhexane 2, 4-Dimethylhexane 2, 2, 3-Trimethylpentane Toluene	Suspected from volume of distillate and R. I. curve. Toluene separated by nitration.
115-127	(†)	Paraffinic Naphthenic	n-Octane 2-Methylheptane m-Dimethylcyclohexane p-Dimethylcyclohexane	Crystallization with and without solvent.
131-141	(‡)	Paraffinic Aromatic	2, 5-Dimethylheptane 2, 4-Dimethylheptane o-, m- and p-Xylenes Ethylbenzene	Paraffins suspected from volume of distillate and R. I. curve. Aromatics isolated by extraction and sulphonation.
142-144	(†)	Paraffinic Aromatic	2-Methyloctane 3-Methyloctane o-Xylene	Paraffins suspected from R. I. curve. Aromatic isolated by extraction and sulphonation.

*Indicates a substantially pure substance. †An ideal solution of two or more hydrocarbons having nearly identical boiling points. ‡An azeotropic (minimum or maximum boiling) mixture. §R. I. = refractive index.

TABLE 2—ANALYSIS OF FIGURE 2

Constant-boiling fraction: Approx. boiling range (°C.)	Class	Types of constituents	Names of chief constituents	Method of separation or detection§
79-81	(†)	Naphthenic Paraffinic	Cyclohexane 2, 2-Dimethylpentane	Crystallization.
87-89	(*)	Naphthenic	1, 1-Dimethylcyclopentane	Crystallization.
90-92	(†)	Naphthenic Paraffinic	1, 2-Dimethylcyclopentane 1, 3-Dimethylcyclopentane 3-Methylhexane	Suspected from R. I. curve. 3-Methylhexane detected by R. I. and chlorosulphonic-acid treatment.
103-106	(†)	Naphthenic Paraffinic	Ethylcyclopentane 2, 2, 3, 3-Tetramethylbutane	Suspected from volume of distillate and R. I. curve.
109-111	(†)	Naphthenic Paraffinic	1, 2, 4-Trimethylcyclopentane 2, 5-Dimethylhexane 2, 4-Dimethylhexane 2, 2, 3-Trimethylpentane	Suspected from volume of distillate and R. I. curve.
117-122	(†)	Paraffinic Naphthenic	3, 4-Dimethylhexane 4-Methylheptane 3-Methylheptane Cycloheptane m-Dimethylcyclohexane p-Dimethylcyclohexane	Crystallization with solvent or suspected from volume of distillate and R. I. curve.
123-127	(†)	Paraffinic Naphthenic	(n-Octane) 2, 2, 5-Trimethylhexane 1-Methyl-2-ethylcyclopentane o-Dimethylcyclohexane	Suspected from volume of distillate and R. I. curve.
130-132	(†)	Naphthenic	Ethylcyclohexane n-Propylcyclopentane	Crystallization with solvent. The cyclopentane suspected from R. I. and freezing point behavior.
134-137	(†)	Paraffinic Naphthenic	2, 4-Dimethylheptane 2, 5-Dimethylheptane Nonanaphthene 1, 3, 5-Trimethylcyclohexane	Nonanaphthene isolated by crystallization. Others detected after subsequent fractionation.
140-145	(†)	Paraffinic Naphthenic	2-Methyloctane 3-Methyloctane 4-Methyloctane 1, 2, 4-Trimethylcyclohexane	Detected from volume of distillate, R. I. curve, and subsequent fractionation.

*Indicates a substantially pure substance. †An ideal solution of two or more hydrocarbons having nearly identical boiling points. ‡An azeotropic (minimum or maximum boiling) mixture. §R. I. = refractive index.

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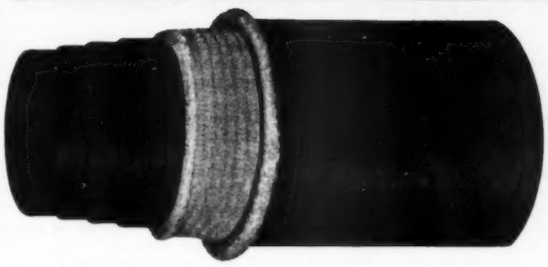

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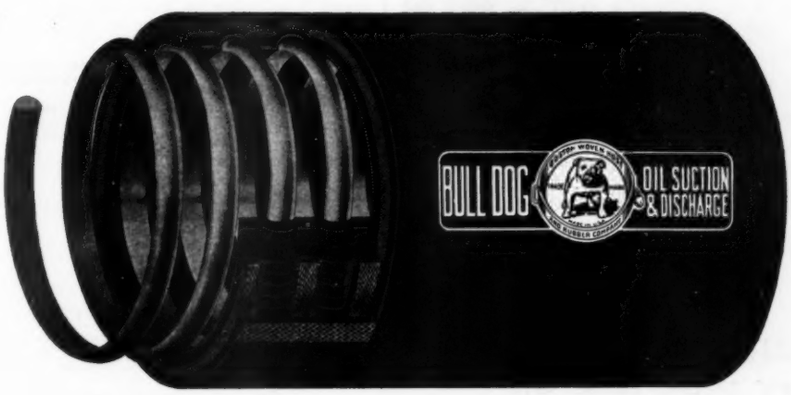

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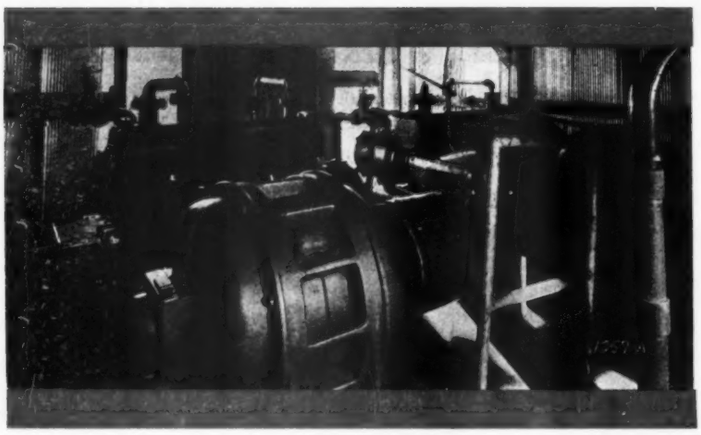

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constant-boiling fractions obtained. Then the interlocking process of separation proceeds.

In Figure 1 together with the volume-temperature curve is shown information which portrays the complexity of the task of separating the constituent hydrocarbons. In the horizontal section, immediately below the volume-temperature curve, are shown, by means of short vertical lines at the appropriate temperatures, the known possible hydrocarbons which may be constituents of the oil. The character of each of these possible constituents is indicated in the four next lower horizontal sections of Figure 1 to be paraffinic, naphthenic (saturated monocyclic), aromatic, or bicyclic (saturated). For each given type of hydrocarbon, both the boiling point and number of possible isomers increase with the size of the molecule, so that the number of the possible constituents increases greatly with rise in boiling point.

The diagonal line drawn just below the curve of refractive index represents the average values of the refractive indices of the paraffinic hydrocarbons. Horizontal lines at about 1.42 and 1.50 would represent approximately average values for the naphthenic (saturated monocyclic) and aromatic hydrocarbons, respectively.

The solid perpendicular lines drawn in the volume-temperature plot indicate the hydrocarbons which were sufficiently predominant in the first set of constant-boiling fractions to be isolated. The types of these isolated hydrocarbons are indicated by appropriate symbols. The height of each of these lines represents roughly the percentage of the fraction 55-145° C. which is estimated to be constituted by the given hydrocarbon. The dotted lines represent, in a similar way, some less abundant hydrocarbons whose presence was later made evident.

Table 1 summarizes the nature of the substantially constant-boiling fractions which appear in Figure 1. Three are of the class (a), or substantially pure substances; five of the class (b), or ideal solutions of components having nearly identical normal boiling points; and three of class (c), or azeotropic mixtures (minimum or maximum-boiling). The last named are attributable to the presence of the aromatic hydrocarbons, benzene, toluene, and xylenes. The presence of these aromatic hydrocarbons is indicated by the sharp rise in the refractive index at the appropriate temperatures.

The hydrocarbons separated from the first set of constant-boiling fractions, by means of crystallization, extraction, etc., include:

1. All the possible normal paraffins: Hexane, heptane, octane.
2. All the 2-methyl derivatives of these normal paraffins.
3. Two other isomers of hexane: 2,3-dimethylbutane and 3-methylpentane.
4. Methylcyclopentane and methylcyclohexane.
5. All the possible aromatic hydrocarbons: Benzene, toluene, ethylbenzene, and the three xylenes.

Figure 2 shows the volume-temperature relation of the fraction after the foregoing compounds were removed and the fraction was again subjected to repeated distillation. As was expected, the removal of the major constituents caused the disappearance of some of the volume peaks which are shown in Figure 1; other volume peaks have become more prominent; and some new ones have appeared. The changes in refractive index

TABLE 3—PARAFFIN HYDROCARBONS IN THE GASOLINE FRACTION (55-145° C.) OF A MID-CONTINENT PETROLEUM

Including: A, those actually isolated;
B, those detected and in process of separation;
C, those whose presence is suspected.

No.	Formula	Name	Boiling point (760 mm.) (°C.)	State of analysis	Est. percentage in the fraction 55-145° C.
1	C_6H_{14}	2, 3-Dimethylbutane	58.0	A	0.30
2	C_6H_{14}	2-Methylpentane	60.4	A	0.65
3	C_6H_{14}	3-Methylpentane	63.3	A	1.30
4	C_6H_{14}	n-Hexane	68.7	A	3.60
5	C_7H_{16}	2, 2-Dimethylpentane	78.9	A	0.20
6	C_7H_{16}	2-Methylhexane	89.7	A	1.80
7	C_7H_{16}	3-Methylhexane	92.0	B	1.45
8	C_7H_{16}	n-Heptane	98.4	A	6.50
9	C_8H_{18}	2, 2, 3, 3-Tetramethylbutane	106.8	C	0.30
10	C_8H_{18}	2, 5-Dimethylhexane	109.2	C	0.25
11	C_8H_{18}	2, 4-Dimethylhexane	109.9	C	0.25
12	C_8H_{18}	2, 2, 3-Trimethylpentane	110.8	C	0.25
13	C_8H_{18}	3, 4-Dimethylhexane	116.5	C	0.35
14	C_8H_{18}	2-Methylheptane	117.2	A	1.10
15	C_8H_{18}	3-Methylheptane	117.6	C	0.90
16	C_8H_{18}	4-Methylheptane	118.0	C	0.90
17	C_8H_{18}	n-Octane	125.4	A	7.25
18	C_9H_{20}	2, 2, 5-Trimethylhexane	126.0	C	1.20
19	C_9H_{20}	2, 4-Dimethylheptane	133.5	B	0.40
20	C_9H_{20}	2, 5-Dimethylheptane	135.9	B	0.50
21	C_9H_{20}	4-Methyloctane	141.6	B	0.95
22	C_9H_{20}	2-Methyloctane	142.8	B	1.45
23	C_9H_{20}	3-Methyloctane	143.4	B	1.45

TABLE 4—NAPHTHENE (SATURATED MONOCYCLIC) HYDROCARBONS IN THE GASOLINE FRACTION (55-145° C.) OF A MID-CONTINENT PETROLEUM

Including: A, those actually isolated;
C, those whose presence is suspected.

No.	Formula	Name	Boiling point (760 mm.) (°C.)	State of analysis	Est. percentage in the fraction 55-145° C.
1	C_6H_{12}	Methylcyclopentane	71.8	A	1.45
2	C_6H_{12}	Cyclohexane	80.8	A	2.20
3	C_7H_{14}	1, 1-Dimethylcyclopentane	87.5	A	0.30
4	C_7H_{14}	1, 3-Dimethylcyclopentane	90.7	C	1.45
5	C_7H_{14}	1, 2-Dimethylcyclopentane	91.8	C	1.45
6	C_7H_{14}	Methylcyclohexane	100.8	A	3.20
7	C_7H_{14}	Ethylcyclopentane	103.0	C	0.30
8	C_8H_{16}	1, 2, 4-Trimethylcyclopentane	112.5–113	C	0.70
9	C_7H_{14}	Cycloheptane	118.1	C	0.90
10	C_8H_{16}	m-Dimethylcyclohexane	120.0	A	1.10
11	C_8H_{16}	p-Dimethylcyclohexane	121.7	C	0.70
12	C_8H_{16}	1-Methyl-2-ethylcyclopentane	124.0	C	0.50
13	C_8H_{16}	o-Dimethylcyclohexane	128.0	C	0.40
14	C_9H_{18}	n-Propylcyclopentane	131.3	C	0.70
15	C_9H_{18}	Ethylcyclohexane	131.9	A	0.70
16	C_9H_{18}	Nonanaphthene (cyclopentane derivative)	136.7	A	0.65
17	C_9H_{18}	1, 3, 5-Trimethylcyclohexane	137–139	C	0.70
18	C_9H_{18}	1, 2, 4-Trimethylcyclohexane	143–144	C	0.70

TABLE 5—AROMATIC HYDROCARBONS IN THE GASOLINE FRACTION (55-145° C.) OF A MID-CONTINENT PETROLEUM

Including only: A, those actually isolated.

No.	Formula	Name	Boiling point (760 mm.) (°C.)	State of analysis	Est. percentage in the fraction 55-145° C.
1	C_6H_6	Benzene	80.2	A	0.60
2	C_7H_8	Toluene	110.5	A	2.20
3	C_8H_{10}	Ethylbenzene	136.1	A	0.30
4	C_8H_{10}	p-Xylene	138.4	A	0.30
5	C_8H_{10}	m-Xylene	139.2	A	0.95
6	C_8H_{10}	o-Xylene	144.4	A	0.95

TABLE 6—SUMMARY OF THE ISOLATED, DETECTED, AND SUSPECTED HYDROCARBONS IN THE 55-145° C. FRACTION OF A MID-CONTINENT PETROLEUM

Type—	Isolated No.	Isolated Estimated relative percentage	Detected or suspected No.	Detected or suspected Estimated relative percentage	Total No.	Total Estimated relative percentage	Known Hydrocarbons reported boiling in the range 55-145° C.
Paraffins	9	40	14	20	23	60	41
Naphthenes*	7	15	11	15	18	30	37
Aromatics	6	10	..	..	6	10	6
Bicyclo-paraffins†	..	..	..	..	..	..	4
Total	22	65	25	35	47	100	88

*Saturated monocyclic. †Saturated bicyclic.

TABLE 7—HYDROCARBONS ISOLATED FROM THE 145-180° C. FRACTION OF A MID-CONTINENT PETROLEUM

No.	Formula	Name	Boiling point (760 mm.) (°C.)	Est. percentage of the fraction 145-180° C.
1	C_9H_{20}	n-Nonane	150.72	15.5
2	$C_{10}H_{22}$	n-Decane	174.02	12.5
3	C_9H_{12}	Mesitylene (1, 3, 5-trimethylbenzene)	164.64	0.3
4	C_9H_{12}	Pseudocumene (1, 2, 4-trimethylbenzene)	169.2	3.0
5	C_9H_{12}	Hemimellitene (1, 2, 3-trimethylbenzene)	176.1	0.9
Total				31.0

have become more marked because of the closer fractionation attainable by distillation of the now less complex mixture. In Figure 2 are indicated by solid vertical lines, in the volume-temperature plot, the hydrocarbons that were separated from this second set of constant-boiling fractions. Those hydrocarbons whose presence was detected are indicated by the broken lines, and those suspected by the dotted lines. As in Figure 1, the known hydrocarbons and the type of molecule are indicated.

Table 2 summarizes the results of a study of the 10 new constant-boiling fractions indicated in Figure 2. All the constituents present in significant amount in the region from 55° to 75° C. have been isolated and identified, and all the oil remaining in the region 98° to 100° C. has been attributed to normal heptane and methylcyclohexane.

Ideal Solutions

A study of Figure 2 indicates that, once the aromatic compounds have been removed, no pronounced tendency to form azeotropic mixtures exists. With the exception of the fraction 87-89° C., all the constant-boiling fractions appearing in Figure 2 can be explained as ideal solutions of two or more hydrocarbons having nearly identical normal boiling points. The one exception may also be explained by considering it to be of the ideal-solution type in which the minor components were present in amounts too small to be detected.

Figure 3 indicates the type and amount of each of the various hydrocarbons which have been actually isolated from the fraction 55-145° C., together with those hydrocarbons detected and in process of separation and those hydrocarbons whose presence in this fraction in significant amount is suspected. The solid lines indicate the hydrocarbons actually isolated; the broken lines, those detected and in process of separation; and the dotted lines, those whose presence is suspected. The ordinate in each case indicates roughly the estimated percentage of the fraction 55-145° C. which is constituted by the given hydrocarbon.

Figure 3 may be said to represent all the information which the project has obtained to date on the hydrocarbon constituents of the gasoline fraction (55-145° C.) of this petroleum.

In Tables 3, 4, and 5 are listed, according to boiling point, state of analysis, and (roughly) percentage content in the fraction 55-145° C., all the various paraffinic, naphthenic (saturated monocyclic), and aromatic hydrocarbons given in Figure 3. In these three tables are listed 47 different hydrocarbons, which number is to be compared with the total of 88 known hydrocarbons reported to boil in the range from 55° to 180° C.

It is to be emphasized that, because the determination of the percentage of a given hydrocarbon in the petroleum is subordinate to the main problem of separation and identification, and because unknown losses occurred all along the way of these pioneering experiments, the figures representing the percentage content must be considered to be rough approximations only. As will be seen from the more detailed report of Leslie and White, the values in the last column of Tables 3, 4, and 5, and the values in Figures 1, 2, and 3, for the individual hydrocarbons, are probably too low by about 50 to 75 per cent; but are, nevertheless, fairly representative of the relative amounts. Since it was the original intention to obtain only the order of magnitude of the percentage content of the identified hydrocarbons, the fact that the estimated percentage contents for the hydrocarbons of the gasoline fraction may add up to only about 60 per cent is gratifying rather than disturbing. When the entire naphtha fraction has been worked out, it will be possible to adjust the values of the percentage content more nearly to represent the actual amounts present. Meanwhile, the figures are reported unadjusted so that they will remain consistent with the values of the percentage content already published.

Table 6 summarizes the information presented in Tables 3, 4, and 5; and gives the estimated relative amounts of the hydrocarbons with respect to type, and also with respect to state of analysis.

The Fraction 145-180° C.

In the range from 145° to 180° C., predominant peaks in the volume-temperature distillation curve occurred near 150°, 160°, and 170° C. Normal nonane was isolated from the region around 150° C.; normal decane, from that around 170° C.; mesitylene, from that around 160° C.; and pseudocumene and hemimellitene, from the fraction 168-175° C. after the normal decane had been removed.

The hydrocarbons actually isolated from the fraction 145-180° C., together with rough estimates of the amounts present, are listed in Table 7. Although there are 80 hydrocarbons reported to boil in this range, about one-third of the fraction 145-180° C. is constituted by the five hydrocarbons listed in Table 7.

Some of the hydrocarbons which are probably present in the remaining oil of the fraction 145-180° C. include: Propylbenzene, ethyltoluene, butylbenzene, methylpropylbenzene, isomers of decane, and certain naphthenes.

Summary for All the Fractions Boiling Below 180° C.

Table 8 lists all the hydrocarbons that have been actually isolated from this Mid-Continent crude by Research Project 6.

In connection with the work of the project on that part of the petroleum normally boiling below 180° C., the following points may be mentioned:

1. All the fraction below 100° C., except the cut 91-92° C., has been completely worked out.

2. No olefinic hydrocarbons are present in the fraction below 180° C., as shown by the zero iodine number.

3. Samples of hydrocarbons representing over half of the fraction 55-180° C. have been isolated and identified.

4. Four of the five possible isomers of hexane have been obtained. The missing one, 2, 2-dimethylbutane (boiling point 49.7° C.) was looked for but not

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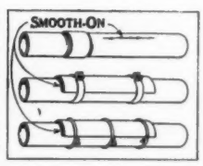

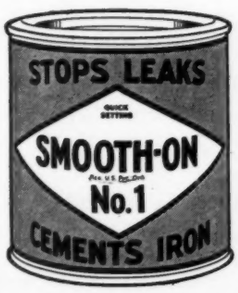

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found; and, if at all, must have been present in an amount too small to be detected.

5. All of the possible aromatic hydrocarbons boiling below 145° C.; viz., benzene, toluene, ethylbenzene, and each of the three xylenes, have been found. The three trimethylbenzenes have also been isolated.

6. The normal paraffin hydrocarbons from hexane to decane, inclusive, together constitute about one-fifth of the fraction 55-180° C.

7. After the normal paraffins, the next more abundant hydrocarbons of the fraction 55-180° C. include: 2-methylhexane, methylcyclopentane, cyclohexane, methylcyclohexane, toluene, and pseudocumene.

8. With the exception of these molecules having five or less carbon atoms, and four others indicated in Table 8, all the hydrocarbons listed in Table 8 were obtained with a purity of about 95 per cent or better, and in most cases with a purity of 99 per cent or better. One hydrocarbon, normal decane, was obtained with a purity of better than 99.99 per cent.

9. Of the hydrocarbons listed in Table 8, 18 have not previously been actually isolated from any petroleum—the evidence for their presence, where reported, having been in most instances based upon the products obtained by chemical treatment of certain petroleum fractions or upon volume peaks in the distillation curve.

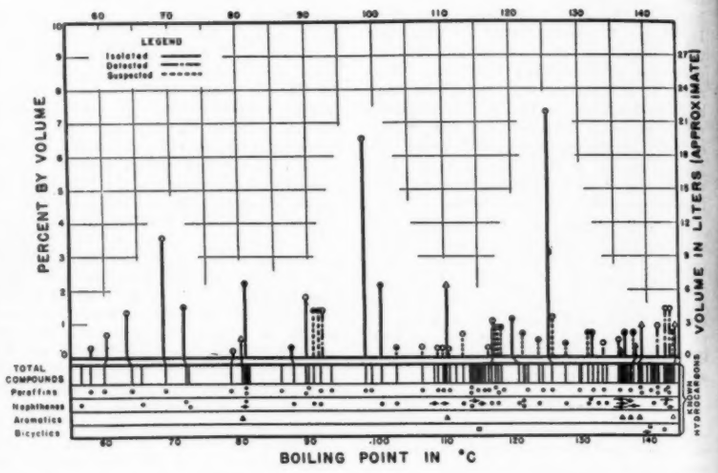

Fig. 3—Composite chart of the hydrocarbons in the gasoline fraction 55-145 deg. C. showing the hydrocarbons isolated, detected and suspected

Possible Benefits to the Industry

The immediate benefits which may arise to the industry from a definite knowledge of the chemical constitution of petroleum, and of practical methods for separating the major chemical constituents, may be summarized, in general, as follows:

1. This knowledge will aid in the better utilization of petroleum for its various present and potential uses. The way will be made clearer for the practical separation of the crude into cuts differing in type of molecule as well as in size (boiling point). Separation by boiling point alone yields cuts possessing a conglomerate mixture of the properties of the paraffinic, naphthenic, and aromatic hydrocarbons. The separation both by type and size yields products possessing desired properties to a higher degree of quality and of a greater variety than before. These petroleum products with specialized properties can better satisfy the many new and specialized needs that the industry is being called upon to serve. A possible application of the foregoing lies in subjecting the gasoline fraction to a process of fractionation whereby those molecules that are excellent antidetonants (the aromatics and the highly branched paraffins) will be separated from those that are poor in this regard. In this way it might be possible to prepare in a practical way some of the gasoline of very high octane number that is needed for certain aviation uses.

2. The various chemical reactions, such as cracking, polymerization, etc., to which certain fractions of petroleum are subjected for the purpose of obtaining products with desired new properties, can be more profitably controlled. Given certain thermal data on heats of reaction and heat capacities, it is possible to determine, without the performance of a single equilibrium measurement, the optimum conditions of temperature and pressure for carrying out a given chemical reaction involving the disappearance of certain known molecules and the formation of certain other known molecules. In the cracking reaction, for example, the desired end products are known, but there is little information about what molecules are actually going into the cracking plant. Without a definite knowledge of the constitution of the charging stock, the full power of the methods of chemical thermodynamics cannot be utilized to control these reactions most economically—and recourse must be had to more or less empirical methods of control, sometimes at great cost to the industry. It is to be expected that for the reactions of cracking, polymerization, oxidation, hydrogenation, etc., the more homogeneous the charging stock with respect to type and size of molecule, the easier it is to determine and maintain the optimum operating conditions, the more homogeneous is the nature of the products formed, and the greater is the yield of substances with the desired properties. It may be said, in general, that any refining process or reaction can be made to give better and greater yields, or to operate more economically, if there is available definite knowledge of the chemical constitution of the charging stock and of methods for making the charge more homogeneous with respect to both size and type of molecule.

3. The naphtha fraction of petroleum can become an important source of chemical compounds for use in industry and science. The use of petroleum as the source of some chemicals is already a matter of history. As the knowledge of the chemical constitution of petroleum increases, the industry can convert the laboratory methods of separation to a commercial basis, and obtain from the naphtha fraction many new chemicals which have or will find an important economic value. One can visualize the use of some of the hydrocarbon constituents as the starting point in the synthetic production of whole series of new substances useful to man. Developments along this latter line have been hampered both by a lack of chemical homogeneity in the oils used as starting materials and by a lack of knowledge of the methods for separating the mixture of products obtained. In this connection,

(Continued on Page 73)

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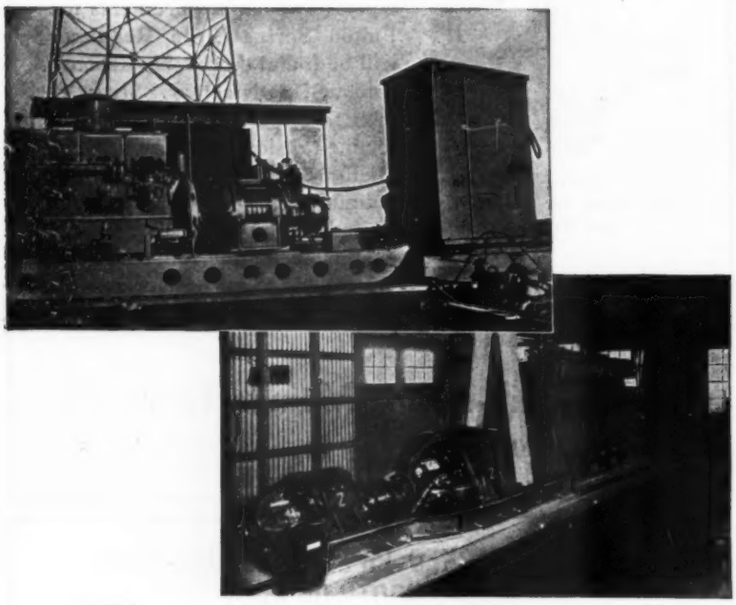

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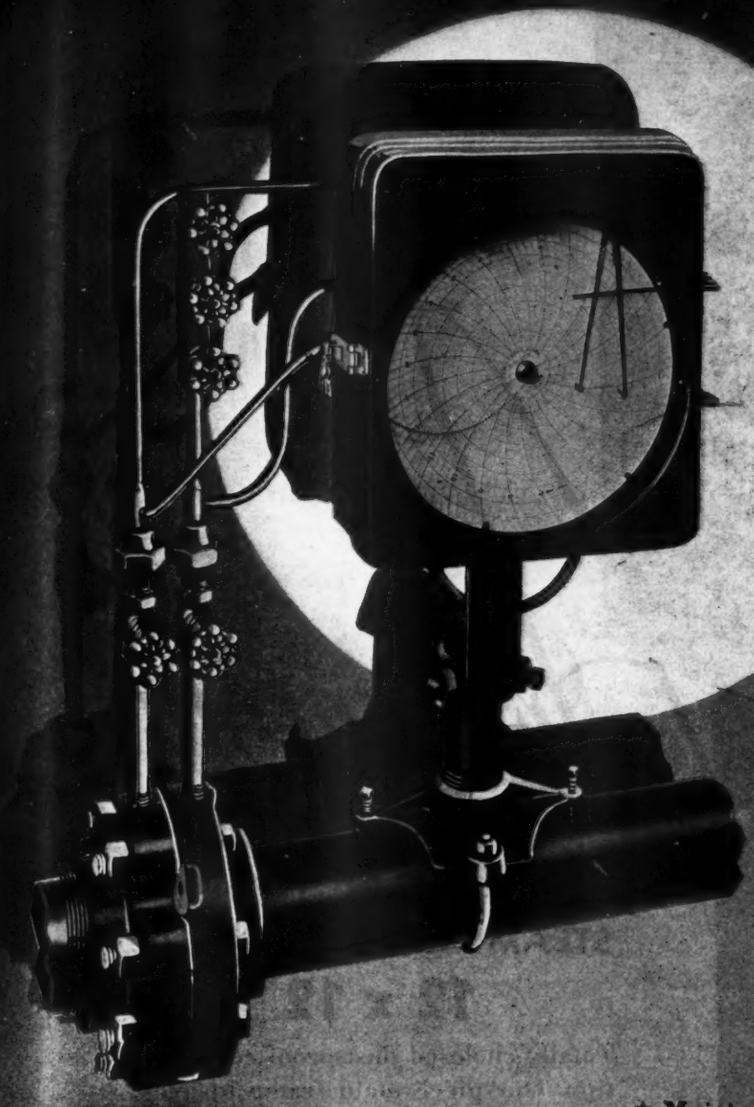

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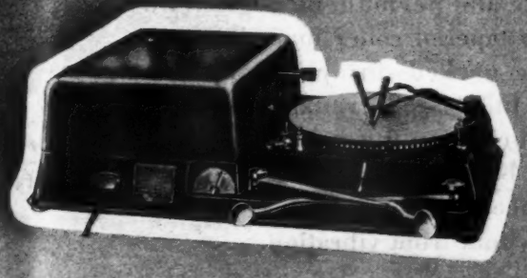

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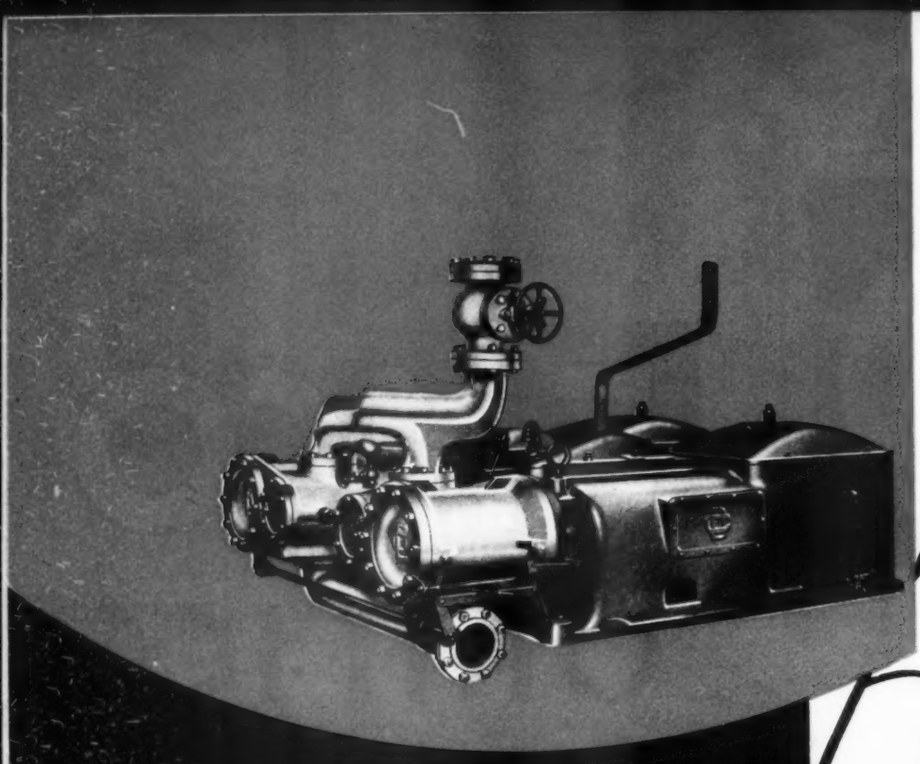

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Technique of Securing and Examining Sub-surface Samples of Oil and Gas

By RALPH J. SCHILTHUIS
Humble Oil & Refining Co.*

Many production problems, particularly those concerned with the flow of oil and gas through the reservoir to the wells, through the well bores to the surface, and the transportation of oil and gas on the surface, require for their solution a knowledge of both the physical transformations and energy changes occurring with changing pressures and temperatures. Such information is also essential in the study of problems dealing with the prediction of reservoir-pressure decline, the effect of rate of production upon rate of reservoir-pressure decline, the efficiency of reservoir-energy utilization, the estimation of underground reserves, production methods for very high-pressure reservoirs where the pressures and temperatures encountered are likely to be higher than the critical pressures and temperatures of the hydrocarbon mixtures contained therein, extraction of natural gasoline, and related problems.

The study of problems involving the performance of oil and gas reservoirs is usually hampered by a lack of proper information concerning the physical nature and behavior of the fluids contained therein under the high pressures encountered. With the development of instruments for measuring subsurface pressures, much information has been collected during the past three or four years on the operation of a number of oil and gas reservoirs. Although these data have been of much interest and value, it has been difficult in most instances to utilize them to the fullest extent on account of the limited knowledge having to do with the behavior of complex hydrocarbon mixtures under the high pressures encountered in the reservoirs.

It is well known that the laws for perfect gases and perfect solutions, without modification, do not adequately express the behavior of oil and/or gas mixtures, even at moderately high pressures. Much valuable work of a fundamental nature has been done, and is now in progress, to investigate the properties of both pure hydrocarbons and mixtures of hydrocarbons and to devise methods of expressing their deviations from the laws for ideal gases and solutions. Important contributions along this line have been made by Lacey[1, 2, 3, 4, 5, 6] and his coworkers; Lewis[7, 8]; Katz and Brown[9]; Cummings, Stone and Volante[10]; Young[11, 12, 13]; Kvalnes and Gaddy[14]; Keyes[15, 16, 17]; Dana[18]; Porter[19]; and others. The present status, however, of the fundamental knowledge relating to the properties of hydrocarbons is such that it is still very difficult, if not impossible, to calculate with certainty the behavior of the complex hydrocarbon mixtures under high pressures. In view of these facts, and until the fundamental knowledge becomes more complete, it appears that the most practicable approach to the problems of the individual fields is through the examination of oil and/or gas samples secured from the reservoirs in as near their original condition as possible. Perhaps the most satisfactory method of obtaining such samples is to take them in the well, preferably near the bottom, under such conditions that the oil and/or gas exists as a single phase or as two phases which are so intimately mixed that a representative sample can be secured.

Beecher and Parkhurst[20] carried on some interesting investigations on surface samples of oil and gas concerning the solubility of gas in crude oil and its resultant effect upon the viscosity and surface tension of the oil. However, except for the work of Sclater and Stephenson[21] and the investigations of Lindsley[22] on the properties of the oil in the East Texas Field, there are little or no published data relating to securing and examining subsurface samples of oil and/or gas from reservoirs. The importance of Lindsley's experiments in supplying definite information on the condition of the oil in the East Texas Field is well known, and need not be discussed further. This paper describes, briefly, one type of equipment that may be employed in securing subsurface samples of oil and gas and the technique used in their examination.

Description and Operation of Sampler

The details of construction of the instrument used to secure and retain under pressure samples of fluids from wells are shown in Figure 1. The instrument is approximately 5 feet long, 1½-inch maximum outside diameter, and has a capacity of about 573 cubic cc. The lower end of the sample chamber is sealed by a check valve in series with a tin disc, of such a thickness that it will fail in a definite time under the temperature and pressure at which the sample is to be taken. The failure of the tin disc allows the fluids in the well to fill the evacuated sample chamber, while the check valve prevents escape of the fluids when the sampler is withdrawn. The upper end of the chamber is closed by a needle valve, through which the fluids may be discharged for examination in the laboratory. The sample chamber is constructed of non-magnetic steel, in order to permit the operation of the magnetic agitator, which provides a means of stirring the sample during the examination. The agitator consists of an iron solenoid core fastened to a steel rod, having aluminum discs spaced at intervals along its length, which extends almost the entire length of the sample chamber. It is suspended from the lower end of the needle valve by a small helical spring. The movement of the agitator is induced by the magnetic field of a coil which may be slipped over the sampler.

The successful operation of the sampler depends upon the failure of the tin disc at the proper time. Under given temperature and pressure, the time required for a tin disc of certain thickness to fail, due to the creep of the metal, is fairly definite. The proper thickness of the disc or discs is determined experimentally for each field in which samples are to be taken, since sufficient data have not yet been accumulated to permit the formulation of definite rules to determine the correct thickness of tin to use under all conditions of temperature and pressure. This is accomplished by inserting a disc of the approximate thickness into the disc nipple, evacuating the sampler through the port in the needle-valve section, and then making connection at the lower end of the disc nipple to a source of pressure. The sampler is then placed in a water bath held at the appropriate temperature, the desired pressure applied, and the time of failure determined. A mercury pump, which will be described later, is adaptable for supplying the pressure. By trial and error, a disc is selected which will fail within the proper time limits.

Under ordinary circumstances, the disc or discs selected are capable of withstanding the pressure and temperature under which the sample is to be taken for a period of from 5 to 15 minutes, although unusual conditions are at times encountered which necessitate the use of a disc that requires a longer time to fail. Experience has shown that it is desirable to leave the instrument at a point where the sample is to be taken for at least 30 minutes, in order to allow for any reasonable variation in the breaking time of the discs.

Table 1 presents a few data obtained on the time of failure of tin discs which are useful as a guide in selecting the approximate thickness of disc to be used. It has been found that the time of failure of a single disc is about the same as that of a number of discs whose combined thickness equals that of the single disc.

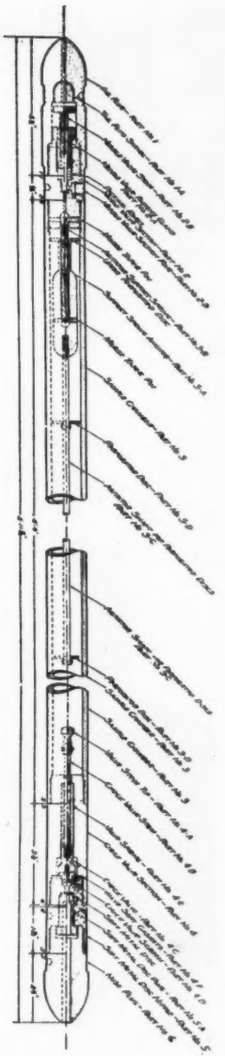

Fig. 1—Sub-surface sampler

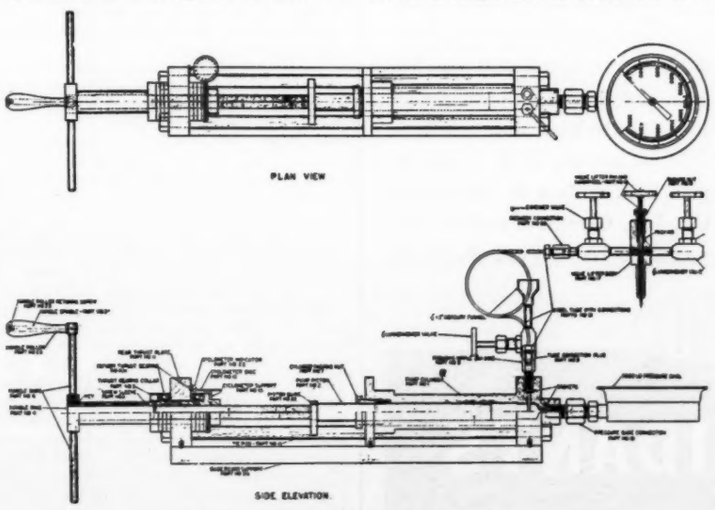

Fig. 2—Mercury pump assembly

TABLE 1—TIME OF FAILURE OF TIN DISCS

Temperature	Pressure (lb. per sq. in. gauge)	Total thickness of tin (inches)	Time required for tin to fail (minutes)
171	2,130	0.067	16
155	1,600	0.040	7
155	1,500	0.037	7
155	1,400	0.034	6
153	1,820	0.050	13
153	1,565	0.042	13
145	1,900	0.042	7
145	1,800	0.042	11
145	1,700	0.042	21
118	1,200	0.025	10
100	1,600	0.029	9
90	1,500	0.029	12

Sampling

The sampler is lowered into a well on a wire line in exactly the same manner as subsurface pressure gauges are run. After being allowed to remain at the desired depth for the proper length of time, the sampler is withdrawn from the well, the nose plug removed, and the tin disc inspected to determine whether or not it failed in the proper manner.

The most important part of the operation of securing samples from wells is to adjust conditions in the well to insure taking a sample of the fluid desired. No definite rules can be established to determine the proper method of preparing wells for sampling. Each well and each field present individual problems which must be solved as they arise. Ordinarily, it is desirable to obtain a sample of the oil, together with only the dissolved gases with which it exists in the reservoir. Such samples are best taken from a well

*Presented at mid-year meeting, American Petroleum Institute, Tulsa, May 15.

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that produces only with dissolved gas, while the well is flowing at a low rate. It is often desirable to obtain samples from wells that produce free gas shortly after the well has been shut in, in order to exclude as much free gas as possible from the sample. Care must be taken that the sampler is stopped above any water that may be standing in the well; otherwise the sampling is done as close to the bottom of the flow string as possible.

Auxiliary Laboratory Equipment Required for Examining Subsurface Samples

Mercury Pump—A mercury pump, the drawing of which is Figure 2, is used to displace the contents of the sampler, to change the pressure on the sample, or to vary the effective volume of the sample chamber by a definite amount. The pump consists essentially of a cylinder and piston, by means of which mercury, in known volume, may be forced into the sample chamber. The position of the piston in the cylinder is measured by a cyclometer. A screw thread on the sleeve of the piston engages a gear attached to the cyclometer disc which, with a dial on the sleeve, permits measurement of the number of turns of the sleeve to less than one-hundredth of a revolution. This enables the piston displacement to be determined easily to within 0.01 cubic cc. There are three openings at the head

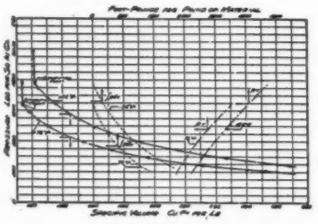

Fig. 3—Pressure-volume-temperature data—Sugarland Oil and Gas

end of the cylinder: One to permit introduction of mercury into the pump, one through which mercury is forced into or withdrawn from the sampler, and one for a pressure-gauge connection. The connection to the sampler is made by means of one-eighth inch steel tubing having suitable end connections as shown. The test gauge has a steel Bourdon tube in order to be resistant to mercury.

Check-Valve Lifter—The check-valve lifter, which is also shown in Figure 2, is used for the purpose of raising and holding the check valve of the sampler off its seat so that mercury can be withdrawn from the sample chamber. It is attached to the sampler at the tin-disc nipple after the tin-disc plug and ruptured disc have been removed. The tapered end of the valve-lifter stem engages the check valve at the recess in the lower end of the valve stem. In the body of the valve lifter, two holes are drilled and tapped for pipe and valve connections—through which connections can be made with the steel tubing leading from the mercury pump.

Solenoid Coil—A solenoid coil is used to produce the magnetic field necessary to operate the agitator which is suspended inside the sample chamber. The coil is wound on a spool which fits around the sampler. In use, it is adjusted on the sample chamber in such position that its center is from 1 to 3 inches either above or below the enlarged part of the agitator, which acts as a core for the coil. The desired motion of the agitator is attained by alternately making and breaking a 110-volt A.C. circuit through the coil.

Water Bath—Ordinarily, it is necessary that the investigations on subsurface samples be carried out under conditions of constant temperature. For this purpose a water bath is used, 11½ inches outside diameter and 8 inches inside diameter, and 51 inches in length—being insulated with pulverized asbestos and closed at the lower end by a steel plate. The steel plate is provided with a stuffing box, through which the lower end of the sampler extends out of the bath so that connection can be made with check-valve lifter and attachments from the mercury pump. Accommodations are also made in the lower plate for electric-immersion heaters which are thermostatically operated by electrical-control equipment, an indicating thermometer bulb, and a drain. The water in the bath is stirred by a motor-driven shaft running the length of the bath, upon which propeller blades are spaced at intervals. The electrical-control equipment is mounted on a panel board attached to the bath as shown.

Calibration of Sampler and Mercury Pump

In making the examination of samples, it is necessary that the net volume of the sampler be accurately known. It is also necessary that the changes in volume, with temperature and pressure, of the sampler and of the mercury in the sampler be accounted for if extreme accuracy is desired.

The net volume of the sampler, at a certain temperature, is determined by closing the needle valve, inverting the sampler with the agitator in place and check valve raised and, with the tin-disc nipple detached from the check-valve section, by pouring mercury in known volume into the sampler until its level just reaches the shoulder in the check-valve section upon which the check-valve gaskets seat. If care is taken that no air is trapped during the operation, the net volume can be determined readily to within 0.1 cubic cc.

It is convenient to determine together the expansion and contraction, with pressure, of the Bourdon tube in the test gauge and the steel tubing leading to the check-valve lifter. This is done by filling the pump, gauge, and tubing with mercury—taking care that no dead-air space exists in the system—and then, with the valve on the check-valve lifter closed, by noting the displacement of the pump piston necessary to build up various pressures. Where care has been taken to expel all air, and where the operations take place over fairly narrow ranges of pressure, this correction is small, and may ordinarily be neglected.

The changes in volume of the sampler with temperature and pressure are investigated by attaching the sampler, filled with mercury, to the check-valve lifter and noting the piston displacement required to produce various pressures at different temperatures. In these operations, the thermal properties of mercury must be accounted for. The thermal expansion or contraction of mercury is approximately 0.01 per cent per degree Fahrenheit of change in temperature. The volume change of mercury with pressure is only 0.025 per cent per 1,000 pounds per square inch, a value so small that it ordinarily may be neglected.

Examination of Samples

The data which can be obtained on oil and/or gas samples with the equipment described include the following:

1. The pressure - volume - temperature relations—as explained before, such data are very important in all problems requiring a knowledge of the energy transformations and the physical changes, both changes in volume and in the state of the material brought about by varying conditions of pressure and temperature.
2. The saturation or bubble-point pressure—the saturation pressure may be defined as the maximum pressure, at a given temperature, under which both the liquid and gas phases may exist in equilibrium. Above the saturation pressure, all gas is dissolved—and only the liquid phase is present. The saturation pressure of an oil and gas sample gives an indication as to whether or not the oil and associated gas exist in the reservoir, under prevailing conditions of pressure and temperature, entirely as a liquid or as two phases, both liquid and gas.
3. The total quantity of gas dissolved in or associated with the oil of an oil and gas sample—such measurements indicate whether the oil is being produced with only its dissolved gas or with additional free gas.
4. The quantities of gas liberated

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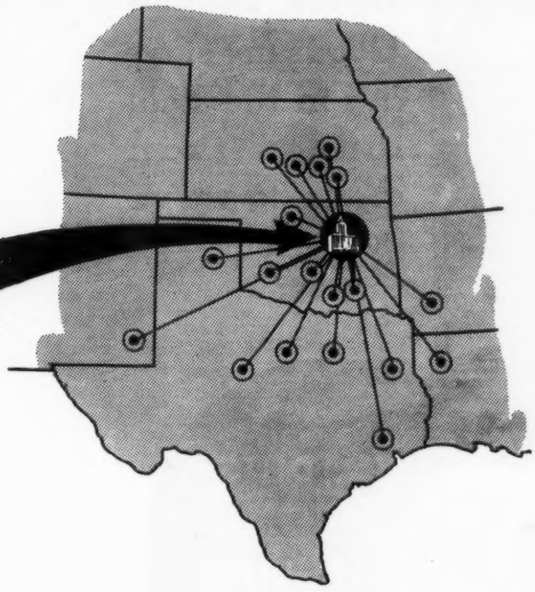

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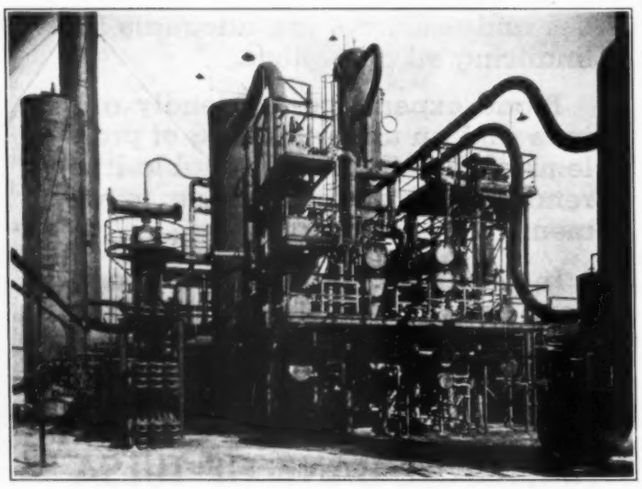

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from an oil and gas sample under various conditions of pressure and temperature—such information is useful in studying the effect of pressure and temperature on the separation of oil and gas at the traps.

5. The shrinkage of the oil (liquid phase) resulting from the release of its dissolved gas from solution or any dedecrease in temperature—such information is useful in setting up proper figures for reserves.

Before beginning the examination of a sample, the first operation is to fill the mercury pump, tubing connections, and the valve lifter with mercury, and then check the system for dead-air space and leaks. The sampler is then attached to the valve lifter after the nose plug, tin-disc plug, and ruptured tin disc have been removed—care being taken that the stem of the valve lifter is retracted sufficiently that it will not engage the end of the check-valve stem and raise the check valve prematurely.

With the sampler attached to the valve lifter, pressure is built up by the mercury pump until the check valve just begins to open and mercury begins to be admitted into the sampler chamber. After recording the piston displacement where initial entrance of mercury into the sampler occurred, the pumping of mercury into the sampler is continued until the pressure on the system is somewhat higher than necessary to dissolve all of the gas and place the sample entirely in a liquid state. During this operation, agitation is supplied either by hand or by means of the magnetic agitator. The pump reading and pressure are again recorded, after which the check valve is raised off its seat by means of the valve lifter. This operation, of course, increases the pressure on the system on account of the displacement of the valve-lifter stem. To account for this, the pressure on the system is brought to its former value, and the pump reading again taken.

To determine the pressure-volume relations on the sample at a certain temperature, the sampler is placed into the bath—inserting it through the stuffing box in the lower end. With the pressure on the system several hundred pounds per square inch higher than the saturation pressure of the sample, the pressure is lowered by suitable increments—agitation being supplied during the process, and pump readings being taken for each increment change in pressure. As long as the pressure on the system is in excess of the saturation pressure of the sample, there is required approximately the same retraction of the pump piston for each increment lowering of the pressure. When the saturation pressure is reached, however, an abrupt change is noted—there being required a much larger retraction of the pump piston to cause the same increment decline in pressure. The operations are continued to obtain the data over the desired range of pressure.

In Figure 3 are shown the data observed in determining the pressure-volume relations, at two different temperatures, on an oil and gas sample. The isothermal energy of expansion and pressure-volume product curves, calculated from the observed pressure-volume data, are also given. The specific volumes of the oil and gas mixtures are based upon 1 pound of the material. The weight of the sample is determined directly by weighing the sampler before and after obtaining the sample, or by calculation from the volumes and densities of the residual oil and gas. The saturation points are indicated by the abrupt breaks in the pressure-volume curves, which at 156° F. occurred at 1,550 pounds per square inch and at 76° F. occurred at 1,275 pounds per square inch. It is noted that the saturation pressure is increased appreciably by an increase in temperature. The slopes of the pressure-volume lines above the saturation pressures are the expansibilities, based upon 1 pound of the material, of the saturated liquid (one phase); while the slopes of the pressure-volume lines below the saturation pressures are the expansibilities of oil-gas mixtures (two phases). As expected, the oil-gas mixtures are much more expansible than saturated liquid. Although it is not apparent in the plot, the expansibility of the saturated liquid increases slightly with increasing temperature, the value at 76° F. being 1.4×10^{-7} cubic feet per pound of material per pound per square inch change in pressure, and that at 156° F. being 1.9×10^{-7} cubic feet per pound of material per pound per square inch change in pressure. The thermal expansion and contraction of the material is represented by the horizontal displacement of the lines in Figure 3 at constant pressure. The thermal contraction or expansion of the saturated liquid is calculated to be approximately 1.0×10^{-5} cubic feet per pound of material per degree F. change in temperature.

The total quantity of gas dissolved in or associated with the oil and gas sample is determined by attaching the sampler at the port in the needle valve to a suitable apparatus, such as a Bunte gas burette, which can be used both as a separator for the oil and liberated gas and to measure the residual oil. The burette is in turn attached to a meter suitable for measuring the liberated gas. The pressure on the sample is then built up to some value which is considerably higher than the saturation pressure of the sample, and the pump reading recorded. A portion of the sample is displaced out of the sampler into the burette, care being taken that the pressure on the sampler is always kept higher than the saturation pressure of the sample. When a sufficient amount of sample has been displaced, pressure is brought to exactly the same value as existed when the operation began, and the pump reading again recorded. From the data obtained, the quantity of gas liberated per unit volume of residual oil can be calculated. The shrinkage of the oil, resulting from the liberation of gas, can also be determined. The oil and gas sample, whose pressure-volume-temperature relations are given in Figure 3, gave off 303 cubic feet of gas per barrel of residual oil at 76° F.—the gas being measured at 60° F. and 1 atmosphere, absolute, pressure. In giving off the gas, the oil (liquid phase) suffered a shrinkage of 11.5 per cent. Accounting for the thermal contraction of the saturated oil between 156° and 76° F., these data indicate that 1 bbl. of the oil as measured at the surface actually occupies 1.18 bbls. of space in the reservoir at a temperature of 156° F. when it contains its dissolved gas.

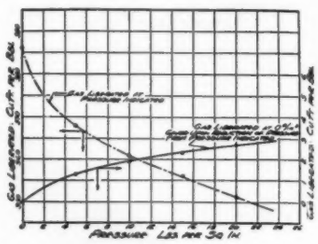

Fig. 4—Effect of separation pressure upon gas liberation

By holding back pressure on the trap which is used to separate the oil and gas in the experiments involving determination of quantities of gas liberated from oil samples, the effect of trap pressure on oil and gas separation can be studied. Samples of the oil and gas separated under various conditions of pressure and temperature can be analyzed and data obtained which are useful in gasoline-plant operation and the determination of weathering losses of oil. Figure 4 shows the effect of the pressure of separation upon the quantities of gas liberated from solution from a Gulf Coast oil.

By methods of subsurface sampling, such as discussed herein, representative samples of the oil and/or gas can be obtained in as near the actual conditions under which they exist in the reservoir as possible. These methods overcome

many of the difficulties encountered in obtaining representative samples at the surface and in handling surface samples. The data which can be obtained from the study of subsurface samples are interesting and valuable, and are essential to the proper understanding and management of the processes involved in oil and gas production.

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An all-time high was reached in the total of special taxes imposed on motor vehicle owners in the form of federal, state and local taxes during 1934, according to a survey made recently by the American Automobile Association. The total motor tax bill for 1934 was $1,160,564,380, as compared with the 1933 total of $1,128,262,331. The taxes were divided as follows: State, county and municipal, $898,226,772; federal, $262,337,558.

C. T. LUPTON DEAD

Charles T. Lupton, 57 years old, oil geologist in Tulsa from 1916 until 1920, died May 8 at Denver, Colo. A native Ohioan, Mr. Lupton graduated from Oberlin College and took degrees from the National University at Washington. He was with the government Geological Survey nine years before coming to Tulsa to join the Cosden Oil & Gas Co. For a short time he was chief geologist for the Frantz Corp. before going to Denver in 1920, where he became a consulting geologist.

Separating Petroleum Into Its Constituents

(Continued from Page 66)

it may be pointed out that the aromatic hydrocarbons (benzene, toluene, and the xylenes) present in one year's production of straightrun gasoline alone are estimated to amount to about seven times that produced annually in the by-product coke industry.

It might be extremely profitable for the industry if fairly pure samples of the major constituents of petroleum were made available at reasonable cost to university and other scientific research laboratories. At present, for example, one kilogram of normal decane having a boiling range of about 2° C. costs about $150. This is prohibitive to the average research institution. Making these hydrocarbons readily available to investigators will result in the accumulation of important data on their properties and behavior, and will lead to the development of new economic uses for these substances.

Conclusion

The successful separation of the naphtha fraction of one petroleum into its major chemical constituents may now be said to be a reality in the laboratory. Although Research Project 6 has invested about 40 man-years of research in the determination of the chemical constitution of the major part of the 55-180° C. fraction of one petroleum, all of that work has been an adventure in unexplored territory. One could now, having chartered and marked the course, accomplish the same results on any crude petroleum with a fraction of that effort.

The future work of the project with regard to the naphtha fraction will be: 1, to complete the separation and identification of the as yet undetermined constituents in that fraction of this Mid-Continent crude; and, 2, to outline a general systematic method for separating the naphtha fraction of any crude petroleum into its major chemical constituents.

TABLE 8—HYDROCARBONS ISOLATED

No.	Formula	Hydrocarbon	Estimated percentage in crude	Purity of best sample (mole per cent)	Published in RP No.*
		Paraffinic			
1	CH_4	Methane	(†)	(†)	.....
2	C_2H_6	Ethane	(†)	(†)	.....
3	C_3H_8	Propane	(†)	(†)	.....
4	C_4H_{10}	n-Butane	(†)	(†)	.....
5	C_5H_{12}	n-Pentane	(†)	(†)	.....
6	C_5H_{12}	2-Methylbutane	(†)	(†)	.....
7	C_6H_{14}	n-Hexane	0.5	98.3	239,311
8	C_6H_{14}	2, 3-Dimethylbutane	} 0.3	>95	239,311
9	C_6H_{14}	2-Methylpentane			
10	C_6H_{14}	3-Methylpentane			
11	C_7H_{16}	n-Heptane	0.9	>99.9	432
12	C_7H_{16}	2, 2-Dimethylpentane	0.03	54	458
13	C_7H_{16}	2-Methylhexane	0.25	99.9	542
14	C_7H_{16}	3-Methylhexane	(‡)	(‡)	.....
15	C_8H_{18}	n-Octane	1.0	99.1	282
16	C_8H_{18}	2-Methylheptane	0.15	97	552
17	C_9H_{20}	n-Nonane	1.0	99.9	383
18	C_9H_{20}	2-Methyloctane	(‡)	(‡)	.....
19	C_9H_{20}	2, 5-Dimethylheptane	(‡)	(‡)	.....
20	$C_{10}H_{22}$	n-Decane	0.8	>99.99	438
		Naphthenic			
21	C_5H_{10}	Cyclopentane	(†)	(†)	.....
22	C_6H_{12}	Methylcyclopentane	0.2	98.9	375
23	C_6H_{12}	Cyclohexane	0.3	99.98	360
24	C_7H_{14}	Methylcyclohexane	0.3	>99.9	432
25	C_7H_{14}	1, 1-Dimethylcyclopentane	0.04	95	542
26	C_8H_{16}	1, 3-Dimethylcyclohexane	0.15	98	.....
27	C_8H_{16}	Ethylcyclohexane	0.1	95	.....
28	C_9H_{18}	Nonanaphthene	0.1	>99	745
		Aromatic			
29	C_6H_6	Benzene	0.08	99.8	311
30	C_7H_8	Toluene	0.3	(†)	280
31	C_8H_{10}	p-Xylene	0.04	>99.9	501
32	C_8H_{10}	o-Xylene	0.12	>99	501
33	C_8H_{10}	m-Xylene	0.12	>99.9	501
34	C_8H_{10}	Ethylbenzene	0.03	94	554
35	C_9H_{12}	Hemimellitene	0.06	99.95	614
36	C_9H_{12}	Pseudocumene	0.2	99.9	614
37	C_9H_{12}	Mesitylene	0.02	99.95	614

*RP No. = Research Paper No. These papers are sold at nominal prices by the Superintendent of Documents, Government Printing Office, Washington, D. C. †Not determined. ‡Determination in progress.

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Laboratory Apparatus For Evaluating Crude

By W. W. SCHEUMANN and J. F. STEWART
Empire Oil & Refining Co.*

This paper briefly describes four distillation units which have been used over a period of three years for crude oil and pressure-distillate evaluations. Experience has also shown that they are adaptable to almost any type of research or development problem involving separations by distillation.

Figure 1 shows the essential parts of the primary distillation unit. It consists

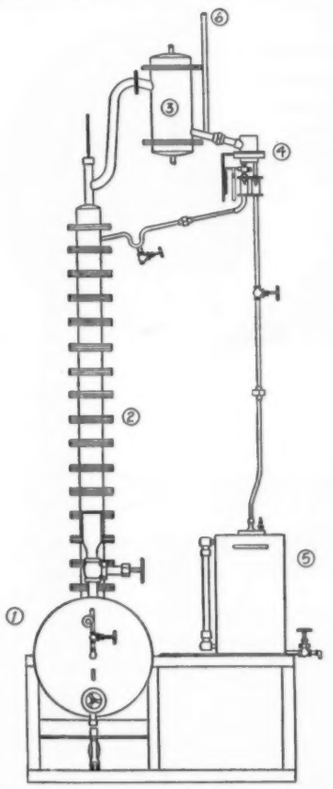

Fig. 1—Construction of atmospheric distillation unit. (1) Still. (2) Fractionating column. (3) Total condenser. (4) Reflux control. (5) Distillate receiver. (6) Vent or connection to stabilizer

of a horizontal still equipped with a 14-plate bubble-cap fractionating column, a three-pass tubular-type total condenser, a reflux control device, and a jacketed distillate receiver which may be iced for collecting low-boiling fractions.

The fractionating column was designed to handle a maximum of approximately 90 cubic feet of vapor per hour. This, for the lighter distillates, corresponds to about 12 liters of liquid per hour, of which 2 to 4 liters would normally be taken off as distillate and 10 to 8 liters returned to the top of the column as reflux. At this rate the vapor velocity through the free space in the column is slightly less than 0.5 feet per second and about 16 feet per second through the bubble-cap slots. The column is built in sections, and consists of 14 plates separated by welded flange spools of 3-inch pipe. Each spool is 3 inches in length. Each plate has one centrally-located vapor uptake and bubble cap, and two downpipes set 90 degrees apart. The downpipes hold a one-half inch liquid level on each plate, and extend one-quarter inch below the liquid level of the tray below. Those from the first tray into the still are provided with U-seals.

The column sections are bolted together. All flange faces of the spools and plates are machined so that no gaskets are required other than a coating of Permatex form-a-gasket cement. The entire column is lagged with a 3-inch thickness of 85 per cent magnesia pipe covering.

The reflux control divides the distillate, and returns the reflux to the top tray of the column by gravity. This device is constructed so that when the control valve is wide open, all of the distillate returns to the column. With the valve partially closed, a one-half inch liquid head builds up in the top chamber before distillate flows down the take-off line. This liquid head maintains a practically constant reflux rate at any valve setting, so that any fluctuations in the column operation may be readily observed in the take-off lookbox. Control valve is of the three-way plug type, one side of which is by-passed into the take-off line. This makes it possible momentarily to cut off the reflux entirely, and to drain the distillate from the upper chamber, when it is desired to separate a fraction.

Stabilizer Unit

The stabilizer was built primarily for use in connection with pressure-distillate evaluations. It was designed for the purpose of obtaining a propane-free butane cut as distillate, with pentanes, and heavier, retained as bottoms. Figure 2 shows the essential parts of this unit. The fractionating column consists of four 5-foot sections of 1-inch extra-heavy pipe. Each section is filled with No. 18 single-jack chain. The condenser and distillate receiver are both connected with a ammonia refrigeration system and cooled by direct expansion. The still is heated with a 1,000-watt electric heater, and is also jacketed for ammonia expansion so that the light bottoms may be chilled before they are withdrawn. The reflux device consists of a double needle-valve arrangement for dividing the distillate stream and returning any desired portion to the top of the column. The unit is built to withstand pressures up to 150 pounds per square inch. The still and lower portion of the column are lagged with 85 per cent magnesia pipe covering. All other parts are insulated with cork.

A small gas compressor is employed to transfer uncondensed vapors from the atmospheric still to the stabilizer.

Atmospheric Unit

The atmospheric unit may be operated either in conjunction with the stabilizer or as a separate unit. For the evaluation of crude oils the stabilizer is ordinarily used only to condense the lightest fractions, while in rerunning pressure distillates the two units are operated in conjunction.

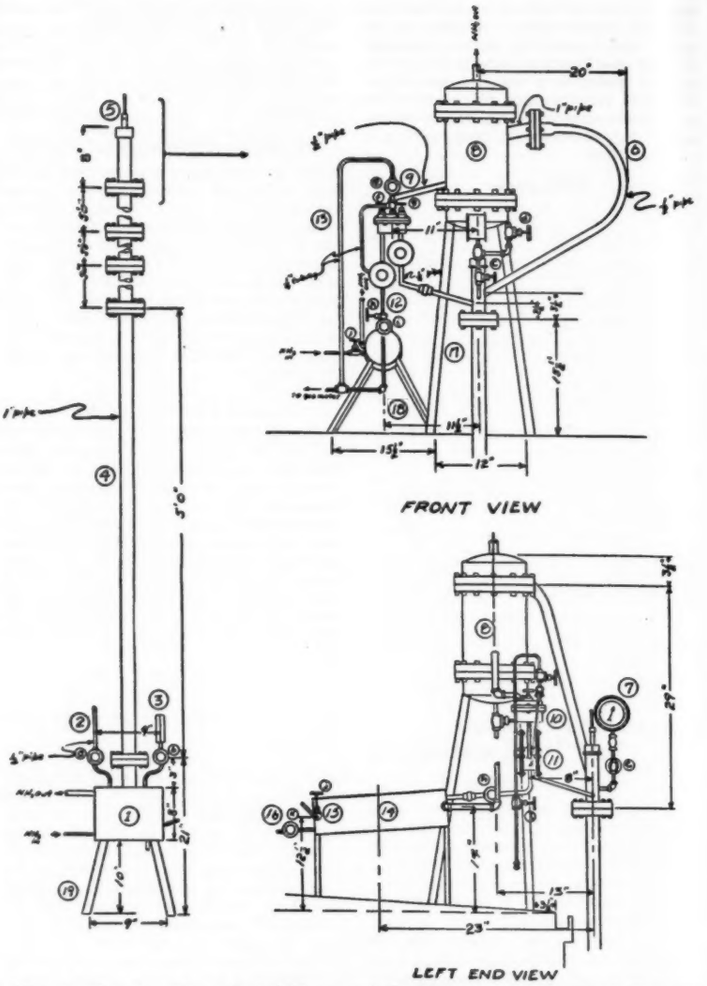

Fig. 2—Construction of stabilizer. (1) Stabilizer pot. (2) Feed line. (3) Pressure gauge. (4) Stabilizer column. (5) Thermometer. (6) Vapor line. (7) Pressure gauge. (8) Condenser. (9) Condensate line. (10) Reflux regulator. (11) Look boxes. (12) Gas-outlet valve. (13) Gas line. (14) Condensate receiver. (15) NH_3 valve. (16) Condensate outlet. (17) Condenser supports. (18) Receiver supports. (19) Stabilizer-pot supports

For crude oil evaluation, approximately 5 gallons of the crude is measured or weighed into the atmospheric still. In order to avoid loss of low boiling constituents, all vents from the unit are closed and the reflux control set for total reflux during the initial heating period. Heat is then applied to the still, and uncondensed vapors are pumped over into the stabilizer still—which is cooled to —20° F. The compressor operation is regulated so that the pressure on the atmospheric still is held under 1 pound per square inch gauge. Operation in this manner is continued until the temperature at the top of the column reaches 110° F. At this point cooling water is turned into the condenser, the connection to the stabilizer is closed, and the atmospheric still vented. Distillation then proceeds in the usual manner, with the reflux control set to return about three-fourths of the distillate to the column as reflux. The light distillates condensed in the stabilizer are blended back with the first fraction taken from the atmospheric still.

Fractions are generally separated at 50° F. intervals between 250° F. and 450° F. At each cut point the column is allowed to operate on total reflux for a short period. This concentrates the lowest boiling constituents at the top of the column, which are removed as distillate until the temperature at the top of the column remains constant at the temperature—with the column operating on total reflux. Reasonably sharp separations are obtained in this manner.

The distillate fractions obtained from this distillation are blended to obtain the various commercial grades of gasoline. Sufficient quantities of each grade are then available for determination of octane number, treating requirements, and other pertinent data.

The evaluation of pressure distillates is somewhat more involved. In our work along this line, pressure distillate samples are generally collected in steel drums, under a pressure of about 50 pounds per square inch, directly from the accumulator of the cracking unit. These cylinders are suspended above the atmospheric still, and connected with the charging line by flexible steel tubing. The charge is then gradually released into the still, and all uncondensed vapors are pumped over into the stabilizer. The weight of the charge is determined by the loss in weight of the cylinder.

During the initial heating period additional vapors are pumped over into the stabilizer until the temperature at the top of the atmospheric column reaches 110° F., and no pressure is built up on the atmospheric still with the column operating on total reflux. The atmospheric unit is then vented, and distillation continued in the same manner as described for crude oil evaluation.

The charge in the stabilizer unit at this point consists principally of methane, ethane, propane, butanes, and pentanes, together with a small percentage of air and heavier hydrocarbons. Varying percentages of unsaturated hydrocarbons containing the same number of carbon atoms are also present, and further reference to the normal hydrocarbons will include the unsaturated members boiling in the same range. While this unit may be utilized for various purposes, the usual operation is to bleed off methane, ethane

*Paper presented at mid-year meeting, A.P.I., Tulsa.

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and propane; recover a propane-free distillate fraction containing principally isobutane and butane; and retain butane-free pentanes and heavier bottoms.

With the charge in the stabilizer, the pressure on the unit is usually about 100 pounds per square inch. The condenser is cooled to —35° F., and heat applied to the still. All condensed distillate is returned to the column as reflux. After a short period of refluxing the temperature at the top of the column comes to equilibrium at or below the boiling point of propane corresponding to the system pressure. With liquid propane refluxing to the top of the column, the system pressure is gradually reduced by bleeding off uncondensed methane and ethane from an outlet above the reflux control through a wet test meter at the rate of approximately 0.1 cubic foot per minute. Propane is then bled from the system in the same manner. The density of the gas being bled off is checked at intervals of 0.5 cubic foot to serve as an approximate check on the operation. The cut point between propane and butanes is sharp, being indicated by an abrupt drop in pressure and rapid rise in temperature at the top of the column.

Refluxing is continued until the column again reaches equilibrium. The distillate receiver is then cooled below the boiling point of the butane cut, and opened into the system. Distillation then proceeds in the usual manner, with at least a 2-to-1 reflux ratio to the top of the column. When all of the butane fraction has been distilled over, the distillate receiver is blocked off from the system and the still is cooled to about 40° F. before the bottoms are withdrawn. The stabilizer bottoms are generally blended back with the first fraction from the atmospheric still. Butanes are held in the receiver until required for blending with the various grades of gasoline to obtain the desired vapor pressure.

Typical Operating Data

The efficiency of the atmospheric fractionating column is indicated by the A.S.T.M. distillations of a series of fractions cut from a naphtha as shown in Table 1.

Table 2 shows the results of low temperature fractional-distillation analyses (Podbielniak) on a pressure-distillate charge, and the products obtained by the usual operating procedure.

These analyses show that the butane cut has been well fractionated, being free of both pronane and pentane. The butane content of the stabilizer bottoms can be materially reduced by employing higher distillation temperatures than were used in this particular run.

Flash Vacuum Distillation

The laboratory distillation of lubricating oils from crude oils down to a tar residue is a difficult operation, and cannot be satisfactorily accomplished by ordinary batch-distillation methods. The continuous vacuum flash vaporizer shown in Figure 3 accomplishes this purpose in a very satisfactory manner. No attempt is made to fractionate the vaporizable portion due to the complexity of the apparatus required and the attendant high heat losses. In connection with crude oil evaluation, the charging stock to this unit is the residuum from the atmospheric distillation. However, it will handle practically any charging stock from which the gasoline and preferably the kerosene, fractions have been removed.

Referring again to Figure 3, the essential features of the vacuum flash apparatus consist of a molten-lead heating bath, 8, in which are immersed an oil preheating coil, 3, a steam superheater coil, 6, a vaporizer, 4, provided with a spray trap, 7, and vapor and residuum outlets; a distillate condenser and cooler, 10, a distillate spray trap, 12, and a steam condenser, 13. Auxiliary equipment includes a feed tank, 1, separate receivers for tar, 9, distillate, 11, and condensed steam, 14, together with necessary pumps, gauges and connections.

The feed tank is steam-jacketed so that the charge may be preheated to approximately 250° F. to insure uniform flow through the charging valve. The feed pump, 2, which is a 30-gallon per hour gear pump, circulates the charge continuously through a pressure-relief valve set at 25 pounds per square inch. This holds a constant head against a needle valve through which the charge is metered into the preheater coil. The preheater coil is a 10-foot length of one-eighth inch outside diameter by five-sixty-fourths inch inside diameter seamless-steel tubing. It enters the vaporizer as shown, and is cut off at an angle of 45 degrees on the inside to produce a tangential motion of the flashing vapors.

The shell of the vaporizer is 4-inch extra-heavy pipe. It contains one stripping tray set near the bottom over a distributing spider, through which superheated steam enters. The stripping tray is a 40-mesh screen supported in a circular frame, and provided with a downpipe directly over the tar leg set to hold a three-eighths inch level on the screen. In operation, the tar is prevented from draining through the screen by the upward flow of steam, and intimate contact is obtained. The tar drains from the vaporizer directly into the tar receiver, which is of sufficient size to hold all of the tar normally obtained in one run. Provision for changing the receiver could easily be made by inserting a valve and connection to the vacuum header into the tar line.

Vapors from the vaporizer ascend into the spray trap, which provides a change in vapor velocity and four directional changes. The upper portion of the trap is packed with wire coils. The trap ordinarily functions satisfactorily when totally immersed in molten lead; however, if necessary, additional reflux can be obtained by lowering the level of molten lead in the outer bath.

Vapors from the trap flow into a three-pass, tubular-type, water-cooled condenser, which condenses and cools the distillate, but does not condense the steam. The distillate then flows by gravity into the distillate receiver, 11, from which it is pumped at intervals.

Uncondensed steam, carrying a small quantity of suspended oil, ascends from the condenser outlet into a trap, 12, in which the oil is separated and allowed to flow back into the distillate receiver. Steam passes overhead and down into the jet-type condenser. Water at 40° F. flows continuously over three cascades above the vapor inlet and down into a reservoir, from which it is pumped back to the cooler which is equipped with ammonia-refrigeration coils. The flow of water into the jet condenser is regulated by a valve, and balanced against the pump. A gauge affords visual observation of the water level in the lower reservoir.

The connection to the vacuum pump is at the top of the jet condenser. Vacuum gauges are connected at this point, and also into the vaporizer. In operation, the pressure drop between these two points is normally 8 mm. to 10 mm. The vacuum pump used is a Cenco Megavac.

The heating bath holds approximately 600 pounds of lead. It is heated by four Fisher-Meker-type gas burners. From two and one-half to three hours are required to melt this volume of lead and bring it up to operating temperature. Any temperature between 650° F. and 1,000° F. may be easily held within a range of 5° F. or less, and wide temperature fluctuations in the vaporizing section are impossible due to the large volume of lead. At the end of each run the lead is drained into a vat, and ladled into bar molds of such size that the bars may be placed back into the heating bath for remelting. About 30 minutes are required for this operation.

TABLE 1—OPERATING DATA

Distillation—A.S.T.M. D86-30:	Top-column temperature at cut point— 200° F.	250° F.	300° F.	350° F.	Residue
Initial boiling point	147	208	258	310	364
10 per cent point	158	214	264	313	370
20 per cent point	160	216	266	314	372
30 per cent point	162	217	268	317	376
40 per cent point	164	220	270	318	378
50 per cent point	168	222	272	320	382
60 per cent point	171	224	276	324	386
70 per cent point	176	228	278	326	390
80 per cent point	182	234	283	331	398
90 per cent point	192	240	291	338	408
Endpoint	208	252	306	354	446
Yield of fractions, per cent	20.7	20.8	21.1	19.7	17.7

TABLE 2—PER CENT OF HYDROCARBONS IN FOLLOWING CUTS

Hydrocarbons:	Pressure-distillate charge	Butane cut	Stabilizer bottoms	Stabilizer pressure distillate
Methane	0.40	....	....	....
C_2 compounds	2.10	....	....	....
C_3 compounds	6.34	0.00	0.00	0.00
C_4 compounds	7.30	100.00	13.91	0.00
Butylene	....	34.50	....	....
Iso-butane	....	8.08	....	....
n-butane	....	57.42	....	....
C_5 compounds	7.43	0.00	70.64	5.32
C_6 compounds	8.61	....	11.98	6.89
Residue	67.92	....	3.47	87.79

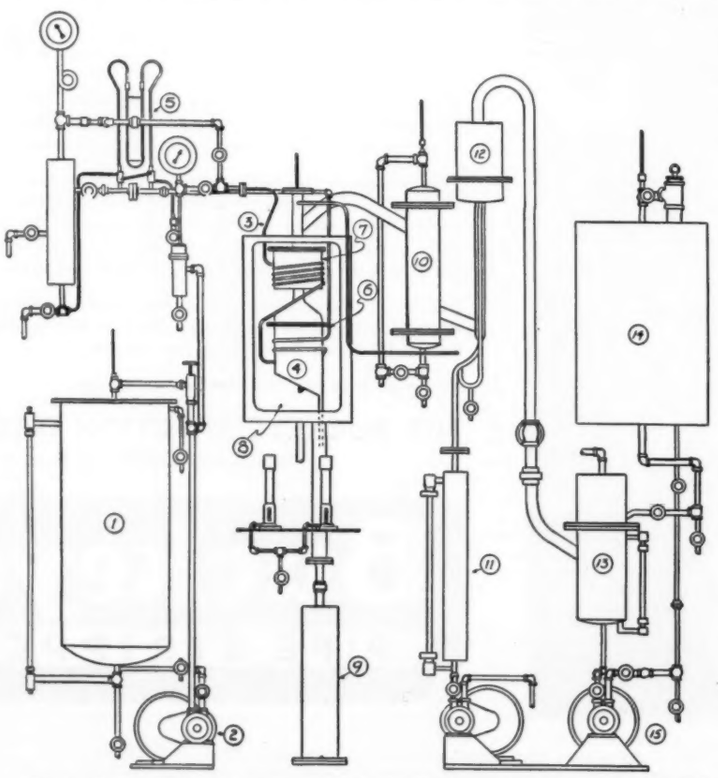

Fig. 3—Construction of vacuum flash distillation unit. (1) Feed tank. (2) Feed pump. (3) Pre-heater coil. (4) Evaporator. (5) Steam flow meter. (6) Steam super-heater coil. (7) Spray trap. (8) Lead bath. (9) Tar receiver. (10) Distillate condenser and cooler. (11) Distillate receiver. (12) Trap. (13) Jet condenser. (14) Water cooler. (15) Water-circulating pump

Operation of Unit

The operation of the unit is relatively simple; and once it is adjusted to the desired operating conditions, it remains very constant—with little attention other than to pump out the distillate as it is collected. No recycling of products is necessary at the beginning of the run, since all parts of the vaporizing section are brought to the operating temperature before the charge is admitted. The character of the tar and percentage of distillate which will be obtained at any given temperature and pressure vary, of course, with the character of the charge and the steam ratio employed. After some experience in operating the unit, it is possible to estimate the proper operating conditions for the desired products with a fair degree of accuracy on the basis of the physical characteristics of the charging stock.

In making a run the preliminary operations include: (1) Heating the lead up to the operating temperature; (2) evacuating the system to 29 inches of mercury or less; (3) cooling the water supply to the jet condenser and regulating the water flow to balance the circulating pump; and, (4) weighing the charge into the feed tank and preheating it to 250° F. With the above adjustments complete, steam is admitted into the vaporizer and regulated—the flow being indicated by an orifice meter. Ordinarily, from 1 to 3 pounds of steam per gallon of charge are used. The needle valve in the charging line is then opened to give a charging rate of approximately 4 liters per hour. The charging rate is then checked by observing the rate of fall of the liquid level in the feed tank gauge glass. Likewise, the distillate rate is checked by observing the rise of the liquid level in the distillate-receiver gauge glass.

Preventing Coking

At the end of each run the preheater coil is blown free of oil by admitting steam just ahead of the charging valve. This prevents coking in the coil. Any light distillate which gets past the distillate spray trap is recovered by draining the water from the cooling system and separating the oil.

An example of the flexibility of the vacuum-flash unit is afforded by a comparison of three runs made on a sample of long residuum from Butler County, Kansas, crude oil. Operating data and the characteristics of the products are shown in Table 3.

It can be seen from the per cent of color removed from the distillate that the unit is efficient for de-asphaltizing long residuum. Wide variations in the properties of the tar result from relatively small changes in operating temperature with this particular charging stock, which is decidedly asphaltic in nature.

Results of a similar series of runs on

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a long residuum from Oklahoma City crude oil are shown in Table 4.

The softening point of the tar is considerably less affected by the flash temperature in the case of this charging stock, which is representative of the Mid-Continent type. Color-removing efficiency remains in the same range.

The unit is capable of handling a large variety of products. On one occasion pressure fuel oil was distilled without difficulty. No appreciable coking occurs in the preheater coil or the vaporizer under ordinary operating conditions, and the only time any difficulty has been encountered was during an attempted run at 1,000° F.—when the tar produced (due

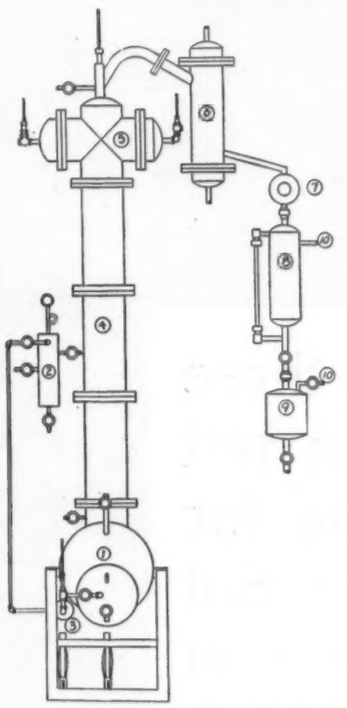

Fig. 4—Construction of vacuum fractionating unit. (1) Still. (2) Steam surge chamber. (3) Steam superheater. (4) Fractionating column. (5) Partial condenser. (6) Total condenser. (7) Look box. (8) Vacuum receiver. (9) Draw-off receiver. (10) Vacuum pump connections

to its high melting point) failed to flow down into the residuum receiver, and coking of the evaporator resulted.

Flash distillation without steam may also be accomplished. For this purpose the unit is operated at 5 mm., or less, absolute pressure; and the steam condenser is employed to insure complete condensation of the lighter fractions. Somewhat lower charging rates are necessary to obtain adequate stripping of the tar.

Flash Vacuum Distillate

The fourth distilling unit of this group was designed to reduce the flash vacuum distillate to cylinder-stock viscosity and fractionate the overhead products. This unit is of the batch type, and was designed to operate under either dry vacuum at pressures down to 2 mm., absolute, or wet vacuum at somewhat higher pressures.

As shown in Figure 4, the unit consists of a horizontal cylindrical still equipped with a fractionating column, a partial condenser for controlling reflux, a condenser and cooler, and distillate receivers for collecting and removing overhead fractions. The still has a charging capacity of approximately 3 gallons; and is provided with an open steam coil in the bottom, through which superheated steam may be admitted.

The fractionating column is built in three sections, each section being 12 inches long and 4 inches in diameter. A

TABLE 3—FLASH VACUUM DISTILLATION OF BUTLER COUNTY, KANSAS, RESIDUUM

	Charging stock	Run No. 1	Run No. 2	Run No. 3
Operating data:				
Lead-bath temperature, °F.	....	700	750	800
Vapor temperature, °F.	....	525	637	700
Steam ratio, pounds of water per gallon of distillate	....	3.75	2.99	4.12
Yield of distillate, per cent	....	68.1	83.3	91.5
Yield of tar, per cent	....	30.7	15.6	7.7
Loss, per cent	....	1.2	1.1	0.8
Quality of products:				
Distillate:				
Color, iodine	37,800	512	880	3,300
Color removed, per cent*	....	90.8	98.1	92.0
Gravity, °A.P.I.	23.8	27.0	26.4	25.0
Viscosity, Saybolt Universal at 210° F., sec.	52	39	41	45
Tar:				
Gravity, °A.P.I.	....	15.1	13.0	....
Softening point, °F.	....	72	144	426

*Per cent color removed = $100 - \frac{\text{iodine color of distillate} \times \text{yield of distillate}}{\text{iodine color of charge}}$

TABLE 4—FLASH VACUUM DISTILLATION OF OKLAHOMA CITY RESIDUUM

	Charging stock	Run No. 19	Run No. 18	Run No. 17
Operating data:				
Lead-bath temperature, °F.	....	740	775	820
Vapor temperature, °F.	....	630	658	715
Steam ratio, pounds of water per gallon of distillate	....	3.93	3.68	3.75
Yield of distillate, per cent	....	87.0	90.5	94.6
Yield of tar, per cent	....	11.5	8.3	5.2
Loss, per cent	....	1.5	1.2	0.2
Quality of products:				
Distillate:				
Color, iodine	12,600	758	820	1,610
Color removed, per cent	....	94.7	94.1	87.9
Gravity, °A.P.I.	25.9	27.6	27.3	27.0
Viscosity, Saybolt Universal at 210° F., sec.	57	48	49	50
Tar:				
Softening point, °F.	....	75	85.5	105

TABLE 5—COMPARISON OF PROPERTIES OF FRACTIONS FROM LABORATORY UNIT WITH THOSE OF COMPONENTS OF BLEND CHARGED
(Degrees Fahrenheit)

	Gas oil		Light wax distillate			Heavy wax distillate		Overhead cylinder stock	
				Laboratory unit					
Distillation:	Commercial unit	Laboratory unit	Commercial unit	1	2	Commercial unit	Laboratory unit	Commercial unit	Laboratory unit
Init. boiling point	432	490	634	648	723	804	793	831	924
5% point	525	527	668	662	761	859	826	924	955
10% point	546	555	686	667	768	876	836	942	960
20% point	575	580	707	675	775	886	847	966	970
30% point	589	591	726	680	778	894	855	981	984
40% point	596	597	743	683	781	900	866	999	1,000
50% point	610	606	760	690	788	907	871	1,014	1,014
60% point	618	613	777	698	795	917	881	1,035	1,036
70% point	630	620	791	704	800	928	890	1,054	1,054
80% point	645	630	807	711	807	948	902	1,075	1,078
90% point	667	641	826	725	819	979	922	1,093	1,095
95% point	706	653	840	735	829	1,006	940	...	...
Endpoint	*800	*669	*860	*745	*838	*1,056	*970	*1,113	*1,115
Aver. boiling point	611	590	756	666	788	917	876	1,000	1,020
Boiling range	368	179	226	97	115	252	177	282	191
Gravity, °A.P.I.	34.5	34.3	30.1	31.3	28.5	24.7	24.2	21.5	21.4
Yield, per cent	...	15.8	....	21.4	23.0	....	16.8	....	23.0
Blend, per cent	15.9	....	44.2	....	....	17.6	....	22.3	....

*Extrapolated. Distillations made at 2 mm., absolute, pressure and values converted to 760 mm.

perforated plate in the bottom of each section serves as a packing support, and also redistributes the reflux. This obviates the possibility of channeling through the entire length of packing. The sections are packed with wire coils. These coils were made by winding 16-gauge galvanized wire around a one-quarter inch diameter rod, then cutting the coil into three-eighths inch lengths.

The use of a partial condenser was considered the simplest method of controlling reflux in this type of unit. In this case the partial condenser is built into the top section of the column. Seven horizontal tubes spaced in three rows extend through the column, and are welded to header plates on each side. Provision is made for cooling, either with water from a constant-head device or with a stream of air metered through an orifice. The approximate volume of reflux can be calculated from inlet and outlet temperatures of the cooling medium and the volume of flow.

The top of the still, fractionating column, and partial condenser are completely insulated with 3½ inches of 85 per cent magnesia pipe covering.

Distillation rate is observed through a lookbox in the distillate line and by the rise of the liquid level in the calibrated gauge glass of the first receiver. An auxiliary pump is required to evacuate the lower receiver, which is used to remove fractions from the system. A mercury-column regulator is provided for regulating the system pressure at any desired point between 2mm. and 25 mm., absolute. A McLeod gauge (0-25 mm.) is connected through a manifold to the still, the top of the fractionating column, and the distillate receiver so that pressures may be checked at these three points.

The actual operation of this distilling unit depends largely upon the nature of the charge being distilled, particularly with regard to the vacuum employed and whether or not steam is used. Generally, flash vacuum distillates of the Mid-Continent type may be reduced to 100 to 120 viscosity at 210° F. with dry vacuum at 2mm. For reduction to higher viscosity, more satisfactory results are obtained by the use of a small amount of steam. When steam is used, it is necessary to connect the jet-condenser system of the flash vacuum unit into the vacuum line between the distillate receiver and the vacuum pump. Permanent connections have been made for this purpose so that the change from dry to wet vacuum can be made by the manipulation of three valves.

In order to determine the relative fractionating efficiency of this unit, a proportionate blend of the distillates from a commercial vacuum unit was made as follows:

	Per cent
Vacuum gas oil	15.9
Light wax distillate	44.2
Heavy wax distillate	17.6
Overhead cylinder stock	22.3

The above blend was distilled in the laboratory unit—taking overhead the gas oil, light wax distillate, and heavy wax distillate, and leaving the cylinder stock as bottoms. Table 5 gives a comparison of the assay distillations, gravities, and yields of the products obtained with those of the original oils before blending. It will be noticed that closer cut fractions are obtained from the laboratory unit than from the commercial unit. The greater sharpness of the cut between heavy wax distillate and cylinder stock is particularly noticeable.

Conclusion

While no claims for originality are made, it is believed that each of the four distilling units described in this paper embody features which may be of interest to others engaged in this type of work. With the exception of the pumps and motors, the entire equipment can be constructed at reasonable cost in any refinery equipped with a machine shop and welding facilities. Although the units were designed primarily for crude oil evaluation, each one has been used for a variety of purposes in connection with research and development problems.

Additional equipment has also been constructed for treating, dewaxing and contacting lubricants so that the various distillation products may be refined to finished products in quantities sufficient for all analyses and tests necessary to determine their quality.

The Solvent Refining of Lub Oil With Furfural

(Continued from Page 53)

mixture into the lower section of the extraction tower. The use of an external cooler is particularly desirable where high ratios of solvent to charge oil are employed, in order to keep yields of refined oil at a maximum.

Extract mixture and refined-oil mixture are withdrawn from the bottom and top of the extractor, respectively. Levels are controlled by a duo-gravity float in the bottom, the continuous phase in the extractor being the oil phase. The separate layers are received in separate surge vessels upon which the extract-mixture charge pump and refined-oil mixture charge pump take suction. The mixtures are stripped in the respective solvent-recovery systems.

The refined-oil mixture is stripped by flashing the solvent from the heated mixture into a vacuum. The amount of solvent passing through this part of the equipment averages about 8 per cent of the total solvent used. The amount of solvent remaining in the oil after flashing averages about 0.4 per cent by weight, and this amount is removed by steaming under a vacuum of about 24 inches mercury in a steam-stripping column. The furfural and water vapors are condensed and pumped to slop solvent, while the dry solvent from the dry-vacuum system is pumped directly to recovered solvent for re-use in the furfural-treating tower.

The extract mixture is stripped in three stages in order to effect a fuel economy. The first step consists in vaporizing at atmospheric pressure about 50 per cent of the solvent in the extract mixture. The vapor from this operation is used to heat and evaporate most of the remaining furfural in the bottoms under vacuum, in the second stage. Circulation through the heater effects the evaporation of all but the final trace of solvent. Extract from the circulation is bled to a vacuum steam stripper, where about 0.4 to 0.5 per cent by weight of furfural is removed. The vapors from this steam stripper are condensed together with vapors from the refined-oil stripper, and the combined condensates pumped to slop solvent. Dry solvent from the extract vacuum stripper, together with dry solvent from the refined-oil stripper, is condensed in a common condenser, and transferred from the receiver to the recovered-solvent tank for use in extracting more oil.

Slop solvent is pumped to a separate tank from which the slop-solvent pump transfers the furfural layer through the solvent drier and the water layer to the fractionater. The fractionater consists of three separate sections—the stripping section, the fractionating section, and the separating section. Steam is introduced to the bottom of the stripping section, and all vapors are condensed at the top and returned to the separating section—where wet furfural layer is continuously removed through a cooler and

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external separator. Furfural-saturated water is continuously returned to the separating section, while water-saturated furfural is run to the solvent drier. The design and operation of this type of solvent fractionator were described by Mains[3].

The solvent drier is a simple device in which wet solvent is heated to 310° F. for removal of water. Wet vapor and furfural vapor return to the fractionator, while dry liquid furfural is run to the dry-solvent accumulator for re-use.

Solvent Losses

Due to the fact that furfural goes off color when handled in the open laboratory equipment, question has arisen concerning its stability. A careful investigation of this subject in the laboratory prior to the plant construction demonstrated that the actual amount of furfural involved in the color reaction was minute, and that solvent losses in a properly-designed plant should be well within the economic limit. This conclusion has been definitely substantiated in plant operation.

In a closed system in plant operation the solvent remains a very light yellow color, and plant losses have been very low—even though recovery temperatures as high as 600° F. have occasionally been reached. Table 1 gives solvent losses in plant operation as determined by actual inventories over an eight months' operating period. It will be noted that the losses have gradually decreased as line leakage and other defects inherent in a new plant have been corrected. During the initial stages of operation, contamination of the solvent with water from a broken condenser tube and other operating difficulties made initial losses rather high. Correction of these difficulties has reduced the solvent loss to only 0.025 per cent of the total furfural used, as determined by plant inventory over the operating period of August 14 to November 12, 1934.

In the Lawrenceville plant the solvent is recovered approximately eight times in each 24 hours of operation. Recovered solvent is of better quality than new solvent due to decreased organic acidity and improved color. Recovered furfural is tested daily for moisture content and per cent of oil. Moisture is kept below 1 per cent by weight.

Operating Costs

Furfural-refining plant-installation costs are dependent to a large extent on each refiner's individual problem. In general, the initial investment for furfural refining is relatively low, ranging from about $300 per barrel of daily charge capacity for units of 500 bbls. per day capacity to about $70 per barrel of daily charge capacity for units having a daily charge rate of 5,000 bbls. per day.

Due to the relatively simple extraction tower, investment costs are lower than would be the case where step-counter-flow equipment is required. Plant design is likewise adapted to the efficient utilization of recovered refinery equipment.

In Table 2 are presented the labor requirements, utilities requirements, and average operating conditions of a commercial furfural-refining unit having a nominal capacity of 1,350 bbls. of Mid-Continent distillate (all grades) per day.

Labor requirements are based on actual operating conditions at the Lawrenceville plant where operating foreman and shift foreman handle other operations in addition to the furfural-refining unit. The labor requirements are sufficient to take care of a much larger unit, and unit labor costs on a larger plant would be reduced practically in proportion to the production.

In the Lawrenceville plant all pumps are steam-driven, exhaust steam being credited for use in other parts of the refinery. Due to the use of steam, electric-power costs are low. A circulating-water system with a cooling tower is in use which reduces the water requirements to evaporation and mechanical-loss requirements.

The average operating conditions are those in use at Lawrenceville, but do not necessarily represent the optimum conditions for a Mid-Continent distillate. Production requirements, which have forced operations well above rated capacity, have necessitated changes in operating conditions from what would be used under normal conditions.

Table 3 gives a detailed statement of operating costs for a typical operating month. Total direct operating expense amounts to only $0.1739 per 42-gallon barrel of charge.

It is felt that the low operating costs are quite satisfactory; and, in the case of the Lawrenceville installation, have resulted in a finished solvent-refined oil at a lower direct cost than when the oil was acid-treated only without the use of solvent. This decrease in cost has resulted in part from generally improved and simplified processing operations and from the increased value of extract over acid sludge.

Tests on Refined Oils

In Table 4 is presented a tabulation illustrating the tests on the raw lubricating stocks, together with the results obtained in the furfural-refining plant operations. Tests are also shown on the same oils dewaxed by the acetone-benzol process.

Attention is called to the fact that this plant is operating at present in the production of oils having viscosity indices and other characteristics which are considered at present to be satisfactorily high for superior performance in service. Increase in solvent dosage and modification of operating conditions would result in higher viscosity indices. It is noted that the viscosity index of the low-viscosity oil insures easy starting in cold weather; while the oxidation tests in Table 7, on both light and heavy oils, indicate their exceptional resistance to sludging and other deterioration characteristic of high-temperature operations. It is noted that the yields obtained are particularly high due to the degree of selectivity of furfural as a refining solvent. A further sacrifice in yields and increased cost of operation is not considered justified at present for the doubtful advantage of a few points increase in viscosity index[4].

The finishing steps employed in manufacture of low-pour-test solvent-refined lubricants consist in acid-treating raffinate with 2 to 5 pounds per barrel of 98 per cent acid, contact-neutralizing with 4 to 12 pounds per barrel of contact clay, and dewaxing with acetone-benzol to a pour test below 0° F. The light acid treatment is considered more efficient and economical than straight percolation or contact filtering, although a satisfactory product can be made by the latter methods using no acid.

Road tests conducted on furfural-refined oils have confirmed the laboratory tests made on these oils; and in service the furfural-refined oils show much less carbon deposition and sludge formation, with slightly less consumption, and less change of viscosity in service, than high-viscosity-index oils which have not been refined by solvent means.

The ability of the furfural-refining process to produce oils having a viscosity index of above 100 has been clearly demonstrated in pilot-unit counter-flow-tower runs. In Table 5 are shown data on the furfural refining of a wax-free heavy-distillate stock dewaxed in the raw state prior to furfural refining. In furfural treatment of dewaxed 180-viscosity (at 100° F.) pale oil from Pennsylvania stocks, viscosity indices of 120 (Dean and Davis) have been obtained with excellent yields of product.

Application of Furfural to Various Lubricating Stocks

Although the furfural-refining plant at Lawrenceville has operated on Mid-Continent distillates only, many pilot-unit runs have clearly established the application of furfural to a very wide variety of lubricating stocks. In Table 8 are shown the results of pilot-unit runs in refining the following typical stocks:

1. Pennsylvania neutral.
2. Pennsylvania residuum.
3. Coastal distillate.

The results shown in Table 7 on Pennsylvania residuum indicate the removal of undesirable constituents with good yields of refined oil. The action of furfural on steam-refined Pennsylvania stock renders this stock much more susceptible to clay filtration to a given color specification, and lowers the carbon residue.

On the Pennsylvania neutral oil, high yields of refined oil are obtained with a considerable improvement in viscosity index and carbon residue.

On the Gulf Coast distillate reasonably high yields of high-quality oil are noted. Without acid treatment the viscosity index has been increased 55 points, and with only a light clay-contact treatment the product has excellent demulsibility tests.

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National Stripper Well Association Convention

The National Stripper Well Association at its convention in Oklahoma City last week went on record favoring a decrease in minimum wages fixed by the Petroleum Policy Board under the code.

Members declared the wage minimums too high to permit operation of the small producing properties. The association, representing 18 oil and gas associations in virtually all of the oil-producing states, agreed to ask the reduction immediately.

Previously the organization had asked for a wage reduction of 25 per cent for wells less than 1,000 feet deep, and 15 per cent for wells less than 2,500 feet deep. A slight reduction was granted, but not the objective sought.

The operators now are paying wages ranging from $75 to $125 monthly and wish to continue paying those rates but the code calls for more. Reductions to be sought would bring the code minimums approximately to those figures.

The oil men were urged to sponsor a survey of production costs in the shallow and old oil districts.

Russell B. Brown, general counsel of the Independent Petroleum Association of America, and Harold B. Fell, vice president of the stripper association, said such data is needed in presenting the oil industry's case to Congress for remedial legislation.

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■

Care in Use of Drill Stem Suggested With Attention to Weight, Speed

By H. W. FLETCHER
Hughes Tool Co., Houston, Tex.*

The loading imposed on the drill stem in service consists of tension, compression, and torsion—together with flexure due to the long column effect or to crooked hole, flexure being particularly severe where cavities are encountered. Failures due to direct stress are, however, comparatively rare, as is evidenced by the fact that, in spite of the ductile character of the material in both pipe and tool joints, fractures commonly have the appearance of brittle failure, i.e., are the result of fatigue due to varying stress. The proportion in which these various loads are encountered varies from point to point in the string, and changes from instant to instant, depending on the variation of direct loading and changes in the mode of vibration.

Passing by, for the moment, consideration of "live" loads, even a superficial consideration of the statics of the structure will uncover a surprising complexity in these apparently simple members.

Consider first the pipe end of the joint from the point of view that the taper-threaded pipe is a mandrel designed to expand the pipe end of the tool joint. A simple calculation will show that the mechanical advantage of this device is in excess of 2,600 to 1. In other words, if a certain tangential force is applied to the outside diameter of the pipe to cause it to make up in the tool joint, and in the absence of friction, the bursting force exerted on the tool joint will be 2,600 times as great as the force applied. Since the joints do set up to a point where the pipe may be wrung off in torsion, it is apparent that very large tangential-friction forces must be set up on the threads, and that these forces will vary inversely as the coefficient of friction. In other words, the higher the coefficient of friction, the less the stress required to set up the required torque resistance.

Hazard of Galling the Surface

Immediately the question arises, why then grease the threads liberally when making up, which obviously reduces the coefficient of friction and increases the stresses. The answer is, of course, the hazard of galling the surface if an attempt is made to assemble the joints without lubrication. One the other hand, it is evident that such a lubricant should be employed as will give the highest possible coefficient of friction with adequate protection against galling. Zinc-bearing lubricants possess these characteristics to a considerable degree, as there is a marked tendency for the grease to be expelled from the joint in make up, and for the zinc to be compressed into very thin sheets separating the steel surfaces, thereby preventing galling—but presenting reasonably high friction characteristics.

While such a situation as described above is not entirely unexpected in view of the small taper and relatively fine thread employed on the pipe ends, it is somewhat of a surprise to find that even in the case of the pin and box, where the thread is relatively coarse and a rugged shoulder is provided to limit definitely the setting up of the point, it is still the case that almost the entire torque is transmitted by friction. In this case we may conveniently consider the tool-joint box as a device calculated to lift the pin off its shoulder by the reaction of shoulder contact. Using for illustration the 6-inch A.P.I. joint with four threads per inch and a mean pin diameter of about 5½ inches, the mechanical advantage is nearly 70 to 1; much less, to be sure, than in the case of the pipe end, but still sufficiently high so that with a coefficient of friction of 0.2, more than 95 per cent of the torque transmitted is carried by friction on the threads and on the shoulders, and less than 5 per cent as a result of the direct mechanical reactions. Here the matter of lubrication is even more complicated; as the threads are frequently made up and broken out, the grease inevitably carries sand, minute steel slivers, threads of soft rope, and other foreign material, and must withstand making up and breaking out at relatively high speed. Here again, a low coefficient of friction during make-up and break-out is desired to reduce the hazard of galling, and a high coefficient of friction is desired to reduce mechanical stresses and minimize the hazard of tool joint backing off in service.

Elastic Materials

There is a second problem in statics of academic interest only due to the impossibility of working to the extremely close dimensions required, or of maintaining those dimensions under operating conditions; but, nevertheless, an interesting subject for speculation, and possibly of some importance as affecting performance. Both pipe and tool joints are made of elastic materials. In tension loading, the threaded end of the pipe and the pipe end of the tool joint are both in tension, under which loading an elongation is produced in both members—depending on the intensity of stress. In other words, the two members tend in general to stretch together. This is not true of this joint in torsion, as the tangential effort required to resist the applied torque can only be furnished by an appreciable area of contacting surfaces, and the elasticity of the materials will permit relative motion from the first-engaged thread and down the length of the joint, to that point at which the sum of all thread forces equals the applied load. In other words, under varying torque, the first few engaged threads at the big end of the taper will oscillate with respect to each other, which phenomenon may have some bearing on failure through the upset in the last-engaged thread. A still more undesirable situation is encountered in the shouldered pin-and-box joint, where the walls of the box are in axial compression due to the shoulder reaction, and the section of the pin is in tension for the same reason. In this case the tendency is to increase the thread lead of the pin and to decrease the thread lead of the box, thereby concentrating the load on those threads in the region of the base of the pin. A similar situation is encountered in studs and other common threaded connections; and in theory could be corrected, in part at least, by so varying the initial lead so that uniform thread pressure would result under the deformation produced by the desired load. As stated above, this is not a practical solution, in as much as the lead variations required from nominal to secure such a result lie beyond any practical manufacturing limits, and such close dimensions would inevitably be destroyed in a very short time under the severe conditions of abrasion encountered in tool-joint operation. A mathematical treatment of this subject is given by J. P. Den Hartog.[1]

Stress Concentration

Stress concentration is affected to a considerable degree by thread form, particularly in the pipe end where fatigue failures are most frequent. The adoption of the rounded crests and roots for drill-pipe threads marked a considerable advance in design, as the notch effect is thereby very materially reduced and the hazard of fatigue failure thereby lessened. A small clearance is provided in the roots of both members to insure flank contact, rather than crest-to-root contact, but small enough in amount to prevent leakage under the rather high drilling pressures now employed. The root of the pin-and-box threads is also rounded, but a much larger clearance is necessarily allowed—partly further to reduce galling hazards and also to accommodate the foreign material inevitably present in the grease. Pressure seal in the pin and box is secured through the shutoff at the shoulders, the thread form having little effect on the matter of leakage.

Both pipe end and pin-and-box ends must remain tight in service under a mud pressure often exceeding 1,000 pounds per square inch. This high pressure is required partly to supply friction losses in transmission from the surface to the drill bit and in returning the mud fluid with the associated cuttings back to the surface and also to provide the required jetting effect at the bit to keep the cutting edges clean and stir the removed material thoroughly into the mud to insure its removal in the returns. It is, of course, desirable to reduce the transmission losses to a minimum, thereby reducing the surface pressure required to provide a satisfactory jetting action. The pressure losses within the drill stem for a given character and quantity of mud flow are determined by the pipe size and the degree of construction permitted at the tool joint. If the hole through the joint is smaller than the bore of the pipe, the mud velocity must necessarily increase as the fluid enters the pin and again decrease as it leaves.

Pressure energy can be converted to kinetic energy with rather high efficiency and, hence, the entrance losses are of minor importance even with 200 or more orifices in the string. On the contrary, kinetic energy can be converted efficiently to pressure energy only by the most careful design to eliminate shock; and in the limited space available in a tool joint, practically all of the kinetic energy represented by the difference in velocity in the bore of the pin and in the bore of the pipe is lost at each joint. Since this energy loss is proportional to the square of the velocity, a 10 per cent change in velocity involves a 20 per cent loss in energy, and considerable gains in this direction were effected by the introduction of the full-hole tool joint.

Resistance to wear is an important character of both pipe and joints, as the loss of metal results in reduced strength and ultimate certain failure. Reduction of the outside diameter of the joint reduces the shoulder area and increases the hazard of failure by upsetting. Wear of the shoulder itself is apt to be nonuniform and to result in leakage and rapid destruction of the threads by mud cutting. Thread wear may reduce the thread engagement to a point where the joint is structurally unsafe to run, and abrasion on the body of the pipe between joints may so reduce the section as to cause the pipe to wring off under comparatively light loads. Greater resistance to abrasion can only be secured by increased scratch hardness, strength, and toughness. Unfortunately, the first two factors can be secured in any given material only at the expense of the third, and the problem of deciding just how much toughness can be sacrificed in an attempt to increase hardness and strength without at the same time unduly increasing structural failures is a matter of some difficulty. That toughness in itself is of considerable importance in the matter of abrasion resistance is indicated by the relatively great resistance of rubber to this action, where the scratch hardness and strength are in no way comparable to the values encountered in even the milder grades of steel. In the past, drilling conditions have been such that abrasive wear on the diameter usually determined the useful life of the tool joint, but there are at present indications that the change of method involved in the attempt to drill straighter hole has shifted the burden to the threads and shoulders of the tool joint.

Vibration is without doubt the immediate cause of the majority of drill-stem failures, and is at the same time the least amenable to satisfactory analysis. Drill stem in a deep well is in effect a string under variable tension — indeed, with some compression at the lower end, subjected to transverse and torsional vibrations set up both at the surface and at the bottom of the well, and damped to a greater or lesser degree by the mud in the hole and by contact with the walls where such contact occurs. In addition, there are undoubtedly axial vibrations of much higher frequency than the foregoing, but probably of relatively low intensity and with very small amplitude. The tool-joint connections in this string provide undesirable mass concentrations which intensify the stresses set up by these vibrations, particularly in the case of transverse vibration. Difficulties in calculation arise from the fact that the tension is variable, contact with the wall is indeterminate, the frequency of the applied impulses changes, and the degree of damping can hardly be estimated with any reasonable accuracy. For the present, at least, it seems that we must rely on accumulated past experience with related phenomena to suggest methods of combating the failures now encountered.

Gauging and Interchangeability

The fundamental purpose of gauging any product is to control the mating fit of co-operating parts within limits that insure satisfactory performance. This is especially vital with respect to the threads on drill pipe and tool joints; since facilities are not available on the job for correction of errors, and failure is apt to cause a loss out of all proportion to the intrinsic value of the parts involved.

Note that the fit of the product to the gauge is of no importance whatever except in so far as the acceptance or rejection of the work by the gauge controls the variation of mating fit of the product. The attainment of this objective, obviously, involves the provision of such a gauging system as will predict mating fit from gauge data. This is a comparatively simple matter where single dimensions only are involved such as, for instance, the control of diametral clearance on an automobile wrist pin in the piston bosses. Where groups of dimensions must be measured simultaneously, as in the case of straight threads and where the gauge fit depends on lead and thread form as well as on diameter, the problem is more difficult—although still susceptible of a

*Presented before Midyear Meeting, A.P.I., Tulsa. Author's title, "Drill Stem." Introduction entitled "History," omitted.

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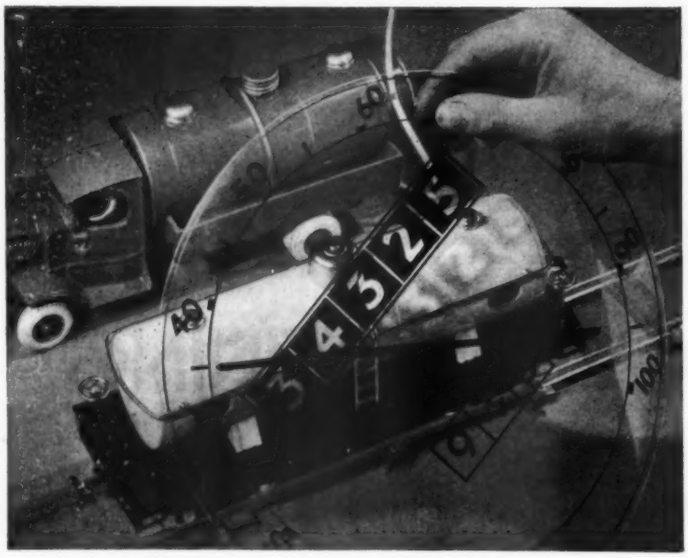

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SYNTHETIC RESINS

fairly satisfactory solution with relatively simple gauges.

When, however, we approach the problem of taper threads, we find the situation considerably more complicated. A simple plug-and-ring gauge must necessarily determine the simultaneous effect of variations in diameter, lead, taper, included angle of the thread, and angle of the thread axis. The step value obtained when the gauge is made up on the product is the result of the mutual effect of errors in the work and in the gauge, which may be either cumulative or compensating. Even were perfect gauges available, gross errors in lead, thread form or taper, with compensating errors in diameter, may exist undetected. The mating-product fit may, obviously, be much looser, in terms of step value, than that predicted by the gauge data, and the assigning of step-value limits for the gauging of the product by no means insures mating-product fit within these same limits.

That such a system can provide satisfactory commercial performance is demonstrated by experience with the Briggs system of pipe-thread gauges discussed in some detail in the report (revised 1928) of the National Screw Thread Commission, and in use for many years on merchant pipe.

On the other hand, the control of drill-pipe and tool-joint threads with such a system leaves much to be desired, due to the fact that sections are proportionately heavier and less yielding, thread engagement is longer, multiplying the effect of errors in terms of step value, and materials having higher physical properties are commonly employed.

A.P.I. System of Gauges

An unquestioned improvement in the uniformity of both pipe and tool-joint threads, to a degree fully justifying the establishment of this rather expensive gauging system, has resulted from the establishment of the A.P.I. system of gauges for drill pipe and tool joints, with a corresponding reduction in thread troubles in the field. On the other hand, it is not generally recognized that these gauges do not, in fact, constitute a limit system, and that the assigning of close-step value limits in the gauging specification does not in any way guarantee a corresponding uniformity of product fit. The latter depends as well on the skill and integrity of the manufacturer and on the excellence of his equipment, both for machining and for measurement.

While there is no indication that this situation has any bearing on the subject of field failures to be discussed in a later chapter—since thread failures have practically vanished—opportunity exists for serious controversy between manufacturer and customer over the question of minor discrepancies in gauging under the misapprehension that the figures would predicate a similar error in proper mating product fit and consequent danger of failure.

Up to the present, no satisfactory solution of this situation has been suggested. Measurement of the individual thread elements requires the use of optical equipment and precision-measuring machines unsuitable for use in commercial production—although applicable in some degree to the inspection of the tools with which the threads are produced. Satisfactory performance is the best evidence that the present system, desirable for its apparent simplicity, is suitable for the purpose in spite of the technical loopholes existing.

Drill-Stem Failures

Every attempt has been made in the past to design the tool joints stronger than the pipe in spite of the rather complicated loading resulting from the shouldered construction, and discussed at the beginning of this paper. It was not uncommon in the early days for the shoulder reaction to lift the pin, causing failure at the root of the pin threads and near the large end of the taper. This type of failure was practically eliminated by the introduction of heat-treated alloy material with a strength so much higher than that of the body of the pipe as to overbalance the greater stress resulting from the combination of torsion, flexure and tension with the shoulder reaction—which, in spite of the high thread and shoulder friction, is sometimes sufficient to cause plastic flow of the metal in the shoulders.

Split tool joint pipe ends are at times the source of considerable difficulty, and can almost invariably be traced to streaks of nonmetallics in the steel from which the joint is made, or from seams imperfectly chipped from the billets. These defects can usually be readily detected while the joint is being turned, and careful inspection during this process will practically eliminate the chance of joints exhibiting this weakness getting into service. There is no remedy that can be applied to save the material, as the defect is an actual discontinuity in the structure of the metal — and the only safe course is to scrap all material showing evidence of this damage.

Leaks in the pipe end of tool joints are at times very troublesome, particularly since drilling practice was modified in an effort to reduce deviation of the hole from vertical. This phenomenon was first discovered on a large scale in the early days of Oklahoma City, where the light drilling weights employed greatly reduced the operating torque in the drill stem, and the greater depth of the wells resulted in high-tension values in the string, and severe vibration. It was here demonstrated that tool joints might actually unscrew from the pipe while drilling was in progress, as discussed at some length in a paper by Hayward.[3] It was also demonstrated that even grossly misfitting pipe threads would plug off with mud, provided relative motion was prevented; but that if the joint wabbled ever so little, mud would creep through the threads, and eventually destroy them. The same remarks apply to the pin-and-box threads, illustrating an extreme case of mud cutting on a pin which has wabbled in use. The seal in the tool joint is made at the shoulder, and damage to this shoulder either from abrasion or by denting is very apt to result in a washout.

Wabbling of Pin and Box

At the present time wabbling of the pin and box in service, with resulting thread-and-shoulder wear and the concentration of loads resulting therefrom, are the principal causes of drill-stem difficulties. Failures of this type invariably exhibit the following characteristics:

1. A more or less triangular section of threads is broken out near the base of the pin at two points diametrically opposite.
2. The thread form along this diameter shows relatively little loss by abrasion.
3. The thread form at 90 degrees with this diameter shows severe loss by abrasion.
4. A small gall spot appears on the shoulder directly over the broken threads on both sides of the pin.
5. A triangular section is broken out of the box shoulder at the point which mated with galled spot on the pin shoulder.
6. Wear of the box threads corresponds to that of the pin threads.

This type of failure was first encountered on a large scale in 1931 in Oklahoma and results, in part, from the change in drilling practice discussed in connection with damage to pipe ends. Where high torque is applied to the drill stem in service, there is a constant tendency to make the joints up, and the force is sufficient to overcome thread friction. This keeps the tool-joint shoulders and the pipe ends tightly made up, and prevents wabbling. It a tool joint is not tight before running into the hole, it quickly makes up to a point where there is no perceptible rubbing of the threads or shoulders while drilling. On the other hand, if light drilling load is used, this torque is materially reduced, and the thread friction correspondingly increased—by the greater tension due to holding up the weight, which at the same time increases the intensity of transverse vibration and reduces the damping. As a

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result, the level of stored energy in the stem is raised and the frequency and amplitude of stress fluctuation is increased, leading to more frequent fatigue failure.

To avoid wabble in service, it is necessary that the tool joint be tonged up sufficiently tight so that the shoulders still remain in contact when the weight of the string is picked up and with sufficient pressure to avoid shake. This will require a very considerable tonging effort in the case of a deep well, as it is obvious that the force exerted, with a tong acting on the pin threads as a jack, must set up a shoulder reaction in excess of the weight of the drill stem for the shoulders to remain tightly in contact. In other words, there is a tendency for the elasticity of the metal to permit separation of the shoulders as the pipe is picked up.

Reduced drilling weight and high rotative speeds have increased the tendency of the pipe to fail through the last-engaged thread in the upset. This is invariably a typical fatigue failure, having all the appearances of a brittle fracture, but with obviously ductile material on each side of the fracture. It is rather interesting to note, in this connection, that failures of this type were comparatively rare at a time when leaks through the pipe ends were serious; and it seems probable that the creep of the joint on and off the pipe thread in service distributed the fatiguing action and likewise such corrosive attack as might occur, over a considerable area—whereas when joints later were bucked up to a point where thread friction was sufficient to eliminate this creep, this damage was concentrated at one section, and soon resulted in fracture. It seems unlikely that the higher stresses resulting from bucking the joints more tightly on the pipe are responsible for this type of failure, in view of the fact that this practice alone has given satisfactory results in some territories; whereas in certain other districts it has been found necessary, in addition, to weld the tool joint to the pipe. This operation, of course, results in producing a ring of cast steel, undoubtedly in a highly-strained condition, at a point in the structure where all the evidence indicates severe alternating stress. While this would not be considered good practice from a metallurgical point of view, as a matter of fact it solved the difficulty; and there is some evidence—although not in sufficient volume to permit of any generalization—that it is the water tightness of this weld, rather than its added strength, which is responsible for the elimination of failure of this kind.

Trouble from the galling of threads was quite common in the early days, but has been reduced to a point where it is of minor importance since the adoption of alloy steels and full heat treatment for tool joints. In addition to the physical properties of the materials, however, the character of the lubricant employed has a profound influence on failures of this type. Unfortunately, and as usual, there are in this problem two conflicting requirements. The first is that the joint be safely made up to the desired degree of tightness without galling; and the second is that it be set up with enough friction to stay together in the hole. If a lubricant is used with sufficient body to prevent metal-to-metal contact under the forces exerted, it is obvious that galling cannot take place; but, on the other hand, such a joint is very apt to back off due to the usual low values of fluid friction. The most commonly used lubricant is red lead and cylinder oil, and a still more satisfactory material is a suspension of fine zinc dust in a medium-heavy grease. The object of loading the grease with a filler is to introduce some substance, which, even under the highest pressures, will remain in place between the steel surfaces and prevent steel-to-steel contact. Temperatures of from 600 to 700° F. may be reached at the thread surfaces, particularly where the joints are made up rapidly; and oil or grease under these conditions will thin out to such a degree that it is easily squeezed out of the fit and, unless some other material is left behind, a gall is almost certain to result.

Handling

The manner in which tool joints are installed on drill pipe has considerable effect on later performance of the string. Shop assembly is much to be preferred, as it is difficult to keep grit out of the grease on the rig and, more particularly, joints must be tonged up in jerks—greatly increasing the hazard of galling, partly due to the heat generated by fast rotation, but more particularly from the fact that every time motion ceases there is tendency for the surfaces to seize. Where joints are made up in the shop, a low and constant speed of rotation should be employed, not over two or three turns per minute; and some type of torque indicator should be supplied, so that they can be set up to uniform tightness. Care must be taken also to avoid undue variations in the consistency of the lubricant; because if it becomes too heavy, joints may be over-screwed without developing the desired torque resistance.

In running pipe into the hole, every effort should be made to avoid striking the box shoulder with the end of the pin in stabbing, as this is apt to dent the surface and destroy the seal upon which the useful life of the joint depends. Even more damage is apt to result in this respect from the use of a spring hook, as the stand is apt to strike two or three heavy blows as the load bounces on the spring. As pointed out above, it is essential where drilling will be carried on with light weight that the joints be tonged up tight enough to insure that the shoulders will remain in contact—even when under the tension load of the full weight of the pipe. As 6,000 feet of 4-inch drill pipe weighs approximately 100,000 pounds, it is evident that considerable force is required—rather more than is employed in the average case.

The practice of roping in tool joints has much to recommend it from the operator's standpoint, although it is unquestionably hard on tool joints. It should never be relied upon to set the joints up tight where light drilling weights are employed, since only those joints which happen to "hit square" at the end of the roping operation are really tight. A slight sway of the blocks will cause the joints to shoulder on one side only; and while it will sound like a tight make-up, as soon as the blocks sway to center, the shoulders will be loose. While the practice of tonging after roping is not so essential when reasonably heavy drilling weights are employed, and particularly with drag-type bits, trouble will certainly develop if it is omitted when roller bits are run with light loads.

A number of experiments are now in progress relating to this situation—some directed to determine to what extent pin and box will unscrew during drilling, and others to the possible improvement to be effected by setting down on bottom for a short time two or three times a tower and rotating slowly with heavy torque to make the string up tight. Unfortunately, the results of these tests have not been received in time to include the results in this paper.

Improvements

In the light of past experience with drill stem, it would seem that we must look to a reduction in the parasitic weight of the tool joints to reduce fatigue failures in the pipe, although it seems inevitable that this must result in some reduction in the strength of the joint itself. It is possible that in time the use of light drilling weight and high rotative speed may become so general that we can safely reduce the torque-carrying ability of the joint to a sufficient degree to accomplish a noticeable reduction in weight—although there is then the hazard that when the pipe is wound up against a stuck bit, serious tool-joint damage may result throughout the string.

Some improvement can probably be secured through a change in design at the point of attachment of the tool joint to the pipe. A number of experimental strings are now under test in which the pipe thread is either eliminated or so changed in form as further to reduce stress concentration due to the notch effect of the threads, or in which additional sealing and reinforcing means are provided to reduce stress and prevent corrosion attack at this vital point. It is still too soon to state definitely that any of these constructions will "solve the problem"—although there is some indication that a degree of improvement has been accomplished.

The present high cost of fully corrosion-resistant materials is the principal bar to their use to combat corrosion-fatigue failures in those districts where that type of failure is troublesome. Some improvement can be expected from the use of intermediate alloys, there being already a few strings of low-chrome nickel in service. It seems likely that, as price permits, the metallurgical trend will be in that direction.

The ultimate development of pin-and-box design is difficult of prediction. In no other large-scale mechanical application is a connection of this type used to transmit torsion, flexure and tension, or compression. On the other hand, the requirements of simplicity, restricted dimensions, lightest possible weight, and speed and convenience of handling in make-up and break-out rule out the use of key ways, splines, or other mechanical devices commonly employed in shafts for the transmission of power. It seems that the shouldered taper-thread connection best meets all the requirements of this job, and that such improvement as is attained will result from minor refinements in thread form and to a greater degree from more careful handling in service.

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H. V. Foster Resigns and Burdette Blue Succeeds as Head of I. T. I. O.

H. V. Foster, for nearly 32 years president and director of the Indian Territory Illuminating Oil Co., resigned on May 8 at the annual meeting of the company's stockholders in Bartlesville, Okla. Burdette Blue, vice president and general manager of the company, was elected to the presidency. R. L. Morton, treasurer of the Empire Companies, resigned that position to become vice president of the I. T. I. O. to fill the vacancy on the executive staff caused by the resignation of Mr. Foster.

H. V. FOSTER

Notwithstanding his resignation Mr. Foster, through Foster Petroleum Corp., continues his interest in the I. T. I. O. as a stockholder exactly as heretofore, according to the company's statement, and it is also the intention of the I. T. I. O. and the Foster Petroleum Corp. to engage in joint oil leasing and development ventures.

The new president, Burdette Blue, has been with the company many years and is one of the most widely known men in the Mid-Continent Field. During the formative days of the oil code he was regional chairman of this district, but after organizing state groups, he resigned and recommended that the regional chairmanship be abolished so that there might be free exchange of activities between the various states and the code officials in Washington. His recommendation was adopted resulting in the elimination of much red tape.

The Indian Territory Illuminating Oil Co. is one of the oldest, if not the oldest, producing companies in Oklahoma. It grew out of the Foster interest in the famous Osage blanket lease obtained by the father of H. V. Foster and associates before there was any oil production in Oklahoma. The company discovered the Seminole City Pool in 1925 when it drilled into production in the Hunton lime, starting a development which resulted in finding bigger production in the deeper Wilcox sand. The company also opened the Bowlegs Pool in Seminole County and the Oklahoma City Pool, the latter in partnership with the Foster Oil Corp. It became one of the largest producers of oil in the United States as it had large lease holdings on various structures in the Greater Seminole area and in the Oklahoma City Field. At this time the company is the owner of many thousands of acres of leases on carefully selected structures, which have not yet been explored and continues to be one of the leading oil producers in Oklahoma.

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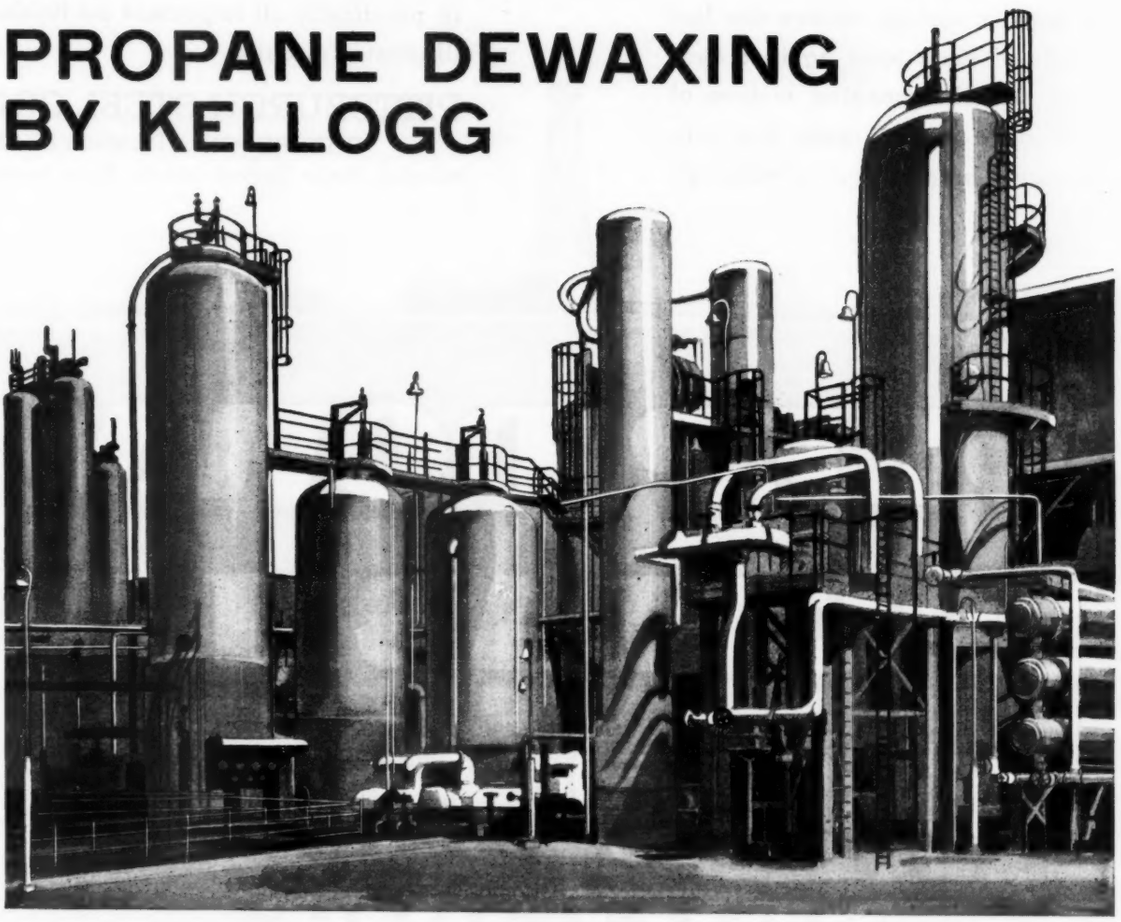

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Discussion of Alcohol at Dearborn Meeting

(Continued from Page 27)

amount of motor fuel consumed. Since 1 bushel of corn produces 2.36 gallons of alcohol it would appear at first glance that the scheme would provide a new market for 700,000,000 bushels of corn. Actually this is not the case, because farmers as a class would have to repurchase from the alcohol plant 'distillers grain' or 'protein feed' having a feed value equivalent to about four-tenths of a bushel of corn for every bushel of corn used to make alcohol. If this feed was not repurchased by the farmers the cost of the alcohol would be still higher. Therefore, the net new demand for corn would be six-tenths of 700,000,000, or 420,000,000 bushels. At 85 cents per bushel the farmer class would receive $357,000,000 for the additional corn. In addition, they would obtain a market for about 92,000,000 bushels of barley required to provide the malt for the fermentation process in making alcohol. At 70 cents per bushel, the barley would yield $64,000,000, and bring the total return to the farmer class to $422,000,000. But the increase in their own motor bill, as shown above, would be $191,000,000, leaving a net cash return to the farmer class of $293,000,000 to cover the sale of 512,000,000 bushels of corn and barley combined. This would return to the farmer an average of 57½ cents per bushel for this additional corn and barley, when the current market price was 85 cents for corn and 70 cents for barley.

"The balance of the Nation would be taxed $639,000,000 in increased cost of motor fuel to cover this increased consumption of 512,000,000 bushels. These consumers would then be paying $1.25 per bushel for this corn and barley in order to return 57½ cents per bushel to the farmer.

Technical Aspects

"There are some apparently contradictory reports as to the quality and technical merits of alcohol blended gasoline. Road testing is a particularly difficult procedure and extreme care must be taken to have all conditions exactly the same when making comparative tests on different fuels. Unless conducted by trained observers and all pertinent data reported, such tests should usually be ignored insofar as mileage, power and acceleration are concerned. The only value in tests conducted by untrained observers would be to indicate whether or not the same car could be run under normal conditions on the two different fuels without damage. Test sales have been carried out in various rural districts during some of which questionnaires have been submitted to each purchaser. In one such instance an average of all replies to the questionnaire indicated an increase in mileage of almost 20 per cent as compared with gasoline. Such reports, combined with the inference that the addition of 10 per cent of alcohol would convert a third grade gasoline into a premium product, have gained such popular credence and support for the blending of alcohol throughout the farm belt.

"The inescapable conclusion from the available reliable data is that the fuel consumption, when using a 10 per cent alcohol blend, will be increased from about 2 to 5 per cent when the cars are adjusted for equivalent performance. When the spark is advanced, or the compression ratio increased to take full advantage of the increased antiknock value of the blend, as was done by Ross and Ormandy, the fuel consumption with the 10 per cent alcohol blend is increased about 2.3 per cent. When used under the same engine conditions as was the case of the Bureau of Standards—American Automobile Association tests the fuel consumption of a 10 per cent alcohol blend is about 5 per cent greater than that of straight gasoline doing the same work under the same conditions.

"From an economic standpoint the blending of alcohol in motor fuel is unsound in this country. It compels the consumer to pay more for an inferior product, and the producer to sell his products at what is in effect a discount. It has no function as a means of conservation which could not be met in a better and more efficient manner by processes already available."

Determining How Much of Column of Pipe Is Free

(Continued from Page 30)

—an extensometer is applied to a length of the pipe above the top of the hole. A pull is taken in the column to take the slack out of it and the extensometer read. The tension in the pipe is then increased and the extensometer again read. At the same time the stretch of the pipe in the hole is measured. Knowing the length, "L-1," of the pipe between the extensometer clamps, the stretch, "e-1," caused by the increased tension, and the stretch, "e-2," of the pipe in the hole, we can calculate the free length, "L-2," by equation (2).

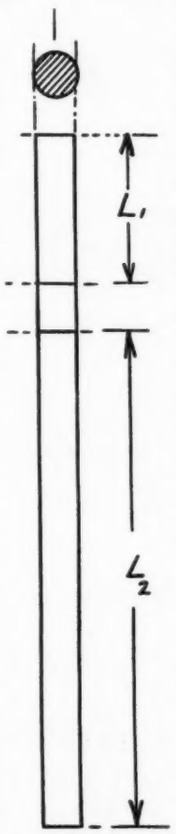

Fig. 4

A suitable extensometer is not usually available at the rig, but one can be improvised in the following manner with materials and tools to be found in any oil field:

Select a joint of pipe between 30 feet and 40 feet long (Figure 5). Spot weld or clamp one end of an old sucker rod to this pipe about 3 feet below the collar, so when the pipe is hanging on the elevators the welded end of the rod will be about 2 feet below the bottom of the elevators. Cut the rod to such a length that when the pipe is stabbed, the lower end will be 4 feet to 5 feet above the floor, and permit the tongues to be used on the pipe to set the pipe up. Cut another piece, "B", of the rod to such a length that when it is stood upon the collar into which the joint of pipe has been screwed there will be a gap between the ends of the two rods, "A" and "B" of 3 inches to 6 inches. Bind with cord or wire the lower end of rod "B" to the pipe, so that it will remain in place. Drill holes in two pieces of wood, "C" and "D," so that they will slip over the rods, and lash to the pipe with cord so that the opposing ends of the rods are held in alignment. The opposing ends of the rods should be filed or ground to rounded points so that the gap between them can be accurately measured. If a sucker rod is not available, any round or flat iron bar can be used instead. Borrow an internal micrometer or a dial gauge. These instruments are used for measuring engine cylinders, and can be found in any work shop or repair garage.

Take a pull in the column of pipe, and measure with the micrometer the gap between the ends of the rods. Increase the tension in the column to the maximum pull considered safe, again measure the distance between the ends of the rods. At the same time, measure the stretch in the whole column caused by the above change in tension:

Let L-1 = the distance in feet between the weld at the upper end of rod "A", and the contact between the lower end of rod "B" and the casing collar.

L-2 = the free length of the column in the hole in feet.

e-1 = the difference between the two micrometer readings in inches.

e-2 = the stretch of the pipe in the hole in inches.

Then:

$$L_2 = L_1 \times \frac{e_2}{e_1}.$$

Regarding the probable accuracy of this method, assume that "L-1" equals 30 feet, and that the stress in the pipe has been changed by 10,000 pounds per square inch. Then the difference between the micrometer readings will be roughly 0.12 inch; and, since the micrometer can be read correctly to plus or minus 0.001 inch, the error should not exceed plus or minus 1 per cent.

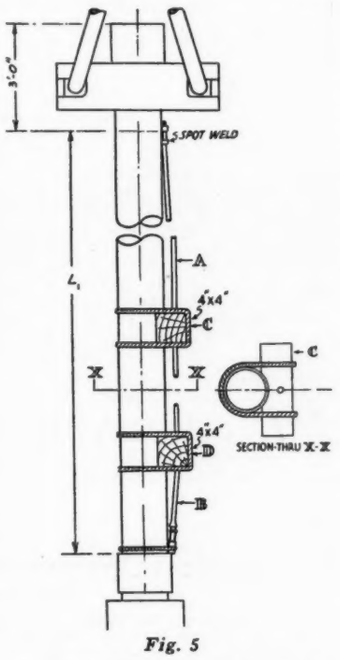

Fig. 5

If it is desired to avoid errors due to friction in the hole, the procedure can be slightly modified as follows:

Make two marks on the column of pipe, corresponding to the stretch caused by the two applied tensions. Pull up to one of these marks, and measure the gap between the rod ends. Slack off to the same mark, and again measure the gap bttween the rod ends. Slack off to the same mark, and again measure the gap. Repeat these operations at the other mark, and use the difference between the arithmetic means of the two pairs of micrometer readings in the equation.

Both methods 1 and 2 can easily be extended to cases where there are two or more sizes and weights of pipe in the hole. The stress changes being known, the stretches in each group of one size and weight can be calculated and, commencing from the top, added until a total equal to the observed total stretch is obtained.

In Fig. 6, the results obtained in a recent test, in which the above two methods were checked against each other, are shown. With the first method, the free length worked out to 1,535 feet; and with the second, 1,580 feet—the difference between the two being less than 3 per cent.

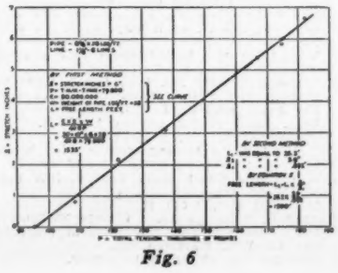
Fig. 6

Third Method

This procedure would be similar to that described under method 2—with the difference that a torsion would be applied to the pipe instead of a pull, and the resulting twists measured. Some form of torsion meter would be applied to a length of the pipe above the ground, a moment applied to the pipe above it, and the angular twists produced in the pipe in the hole and in the length of pipe in the torsion meter measured. The free length could then be calculated with equation (2), using the angular distortions instead of the longitudinal strains.

This method would possess the advantage that, by alternately pulling and slacking off the pipe while maintaining the twisting movement in it, friction in the hole could be prevented from affecting the measurements. It has not, so far as the writer is aware, been used or worked out on a practical scale.

In conclusion, it may be mentioned that measurements upon cemented columns of casing made with the above methods indicate that, when using the pump-and-plug method of placing the cement, the cement comes up much higher than the height calculated by dividing the volume by the annular area. This must be due to channeling; and it is probable that, while a bond sufficient to hold the pipe is formed, shut off, or the prevention of circulation behind the pipe, is obtained only over a comparatively short distance.

Refined Oil Products Continue Upward Trend

(Continued from Page 47)

are commanding prices near third-grade motor gasoline, along with it. Tank car prices after strong advances, are firm.

Heating Oils

The heating oils have been stimulated strongly upward along with the kerosene and tractor fuels, despite lateness of the season for heating purposes. It is hard to find No. 1 heating oil for any purpose and restoration of tank wagon prices for No. 1 throughout the Middle West May 10 emphasized this condition.

Industrial Products

Mixed reports are being received as to the general industrial demand situation, as affecting heavy products, but industrial gas oils continue firm. The fuels themselves are somewhat irregular, but not overly plentiful generally.

Lubricants

Lubricating oil markets show little change here. The buying is not particularly impressive. Jobbers are not very actively participating in the market.

Wax

Wax is slow but on the whole appears to be in slightly better market position than earlier in the year. Inquiries are being received in moderate volume.

Naphthas

Solvents and naphthas have been placed in somewhat better market tone as the result of strength in gasoline but up to now prices are unchanged.

LEO S. FOX DIES

LOS ANGELES, Calif., May 11.—Leo Sanor Fox, assistant chief geologist of the General Petroleum Corp., was fatally injured on the Ridge Route while returning from a scouting trip, and succumbed before medical aid could be summoned. Mr. Fox was exceedingly popular with the geological fraternity, and had the distinction of being the first geologist to explore the base of the Pacific Ocean as it was his duty a few years ago to don a diver's suit and record the dips and plunges of the ocean shore for the General Petroleum Corp. when exploration work was rather hot along the coast of Ventura and Santa Barbara Counties.

New Field Discovered in Northern Duval County; Bruni Townsite Area Is Extended Two Miles

SAN ANTONIO, Tex., May 13.—The discovery of a new field in northern Duval County, a 2-mile south extension to the Bruni Townsite area in Webb County and the encouraging showing being made by three tests in the Roth Field, Bee County, held the attention of the operators in the Southwest Texas district the past week.

Henderson and Harvey's No. 1 Chernosky, 5 miles east of the Eagle Hill Field in Survey No. 226, Duval County, drilled cement plug at 2,224 feet and was completed at a plugged back depth of 2,225 feet, for initial production of 100 bbls. on the pump. It was swabbed until it began to show oil and the operators then let it set for 24 hours before swabbing was resumed. It was swabbed down to 800 feet without flowing and was put on the pump, and is making 100 bbls. per day. While it made only a small well the important feature is that production is from a sand in the upper section of the Hockleyensis which is producing in only a few scattered spots throughout the district, the McNeil Field in Live Oak County and the Lopeno gas field in southern Zapata County, consequently the entire trend running north and south through the county, paralleling the Government Wells trend a few miles east, will no doubt be explored thoroughly in hope of finding more structures of the same type.

The only active test close to the discovery is Santa Clara Oil Co.'s No. 1 Wood-Welder in Survey 385, 1 mile southwest. It is drilling below 1,000 feet. The acreage around the new field is divided into small tracts that will no doubt cause an immediate drilling campaign. Humble Oil & Refining Co. holds leases on some acreage west of the well, and Weinert and others have leases on the south.

Webb County

An important extension to the Bruni Townsite area in Webb County was a completion of Magnolia Petroleum Co.'s No. 1 G. Benavides, in Block 255 of the Myrtle E. Hale Subdivision of the Mariano Arispe grant. Saturated sand was cored from 2,765-73 feet and on a production test it made 12 bbls. per hour through a one-half inch choke. It extends the old 2,700-foot sand 1½ miles west of what is known as the O'Hern and Seacord Pool and opens considerable acreage. The test is south of producers from a deeper pay around 3,400 feet.

Bee County

In Bee County attentions were centered on three tests preparing to test after encountering showings of oil and gas. Dirks Brothers' No. 2 Roth, north of the discovery, topped the sand at 3,842 feet and cored the sand to 3,846 feet. Casing was cemented above the sand and it made 16 bbls. per hour on a seven-thirty-seconds inch choke, with 360 pounds on the tubing and 240 pounds on the casing. Mills Bennett Production Co.'s No. 2 Bassinger, south of its No. 1 Bassinger, a northwest extension well, topped the sand at 3,840 feet and is setting casing to test at a total depth of 3,848 feet. West of this test, Home Oil Co.'s No. 1 Bassinger topped the sand at 3,816 feet and on a drill stem test from 3,810-22 feet, total depth, it recovered 250 feet of oil and 28 pounds of pressure in 15 minutes and is waiting on cement to set.

In the same county, but in the West Tuleta Field, a short distance southeast, McKay's No. 1 Campbell, in the southwest extension area of the field in the B.&B. Survey, topped the sand at 3,925 feet and was completed at 3,934 feet for an initial production of 8 bbls. per hour through a three-sixteenths inch choke. Same operator has skidded the derrick 330 feet south for No. 2 Campbell. Two major companies entered the field by starting two tests. Stanolind Oil & Gas Co. spudded in No. 1 G. W. Walton, 1,119 feet from the north line and 330 feet from the west line of Section 21. It offsets the extension discovery well on the east. Texas Co. is moving in material for No. 1 Young, 660 feet north of Mills Bennett Production Co.'s No. 1 Bassinger. Two wildcats in the county were failures. Dirks Brothers' No. 1 Fannie Goree, about 18 miles northwest of Beeville in the J. O. Taylor Survey, was abandoned at 4,256 feet. Five miles southwest of the Caesar Field, Paul Meaders' No. 1 E. J. Keller in the M. Alcorte Survey, was abandoned at 3,805 feet. Several showings of gas were reported to have been encountered from 1,653-77 feet, 2,384-91 feet and from 2,415-20 feet.

Duval County

North of the Hoffman gas area and east of the Sarnosa Field, Duval County, considerable attention is being given Bridwell Oil Co.'s No. 2 Sutherland, which has the appearance of opening the first oil production in this area. Sand showing saturation was cored from 2,701-18 feet, total depth, and the operators have cemented 7-inch casing at 2,701 feet, after they had recovered 210 feet of oil on a 20-minute drill stem test. It is reported to be checking about 15 feet higher than Conway and Buescher's No. 2 Hoffman, 2 miles east.

A 2-mile south extension looms for the Loma Novia Field in Duval County by the showing of Tex-La Oil & Gas Co.'s (Johnson & Johnson's) No. 1 Hubbard. The plug was being drilled after casing had been cemented in sand at 2,795 feet. On a drill stem test made last week from 2,795-2,802 feet, it showed 270 feet of oil.

Carolina-Texas Oil & Gas Co.'s No. 11 Benavides, a deep test on the south end of the Carolina-Texas gas field and 10 miles northwest of the Bruni Townsite area of West Cole Field, Webb County, that showed promise of opening a deep producing horizon for the field, was being cored deeper from its present depth of 4,974 feet after it failed to show as a commercial well when tested. It was reported to have made approximately 1,750,000 feet of gas, with 750 pounds on the pressure and was reported to have been cleaning itself when the operators decided to core deeper. Saturated sand was reported cored shortly after the cement plug was drilled, and it is the opinion the test will make a producer. The outcome is important, as it is reported to be in the Queen City sand in the Mount Selman formation, which so far has been found to produce only Zapata County.

Sam Fordyce

The Sam Fordyce Field, Hidalgo County, was extended in three directions by the completion of four wells. Six hundred feet northwest of production, Skelly Oil Co.'s No. 2-A Seabury and others' Tract 256, Porcion 38, cored sand from 2,802-08 feet and was completed for an initial production of 15 bbls. per hour through a one-eighth inch choke. Three hundred feet southeast of production, Cortez Oil Corp.'s No. 1-B Smith, Porcion 41, cored sand from 2,751-61 feet and made 60 bbls. per day from a total depth of 2,790 feet. The other producers included Barnett and others' No. 1 Missouri Pacific Railway, that was finaled at 2,758 feet for an initial production of 6 bbls. per hour. Rogers Oil & Gas Co.'s No. 4 F. Guerra, Porcion 40, made 13 bbls. per hour through a three-thirty-seconds-inch choke from a total depth of 2,761 feet.

Wildcat Operations in Southwest Texas

Week Ending May 11

BANDERA COUNTY

Plateau Oil Co.'s No. 1 Garrison, G.C.&S.F. Sur. No. 506, 1,500 ft. from W and 2,970 ft. from N lines of survey.
Standing 3,409 ft.

BASTROP COUNTY

Batts & Jarnson's No. 1 Mrs. Anneta Harris, 160 ft. from NW line, 300 ft. from SW line of 55-ac. tract, Maxomillian Sur. Location.

Malone & Owens' No. 1 Spooner, 500 ft. from N line, 3,550 ft. from SW line of Leverenz Sur.
1,360 ft.; no report.

Marts & Beavens' No. 1 Miller, 235 ft. from NE line, 414 ft. from SE line of Blk. 23, Dykes Sur.
T.D. 3,000 ft.; pulled in derrick.

BEE COUNTY

Dirks Bros.' No. 1 Miller, 330 ft. from N and E lines of tract, C. Rivas Sur.
Moving in rig.

Dirks Bros.' No. 1 Goree, 330 ft. from NW cor. of Turman Sur. in J. Taylor Sur.
Dry and abd. 4,056 ft.

Firm Oil Co.'s No. 1 Copeland, 1,650 ft. from N line, 330 ft. from E line of lease, B. O. Hadley Sur.
Spudded.

Hartzendorf's No. 1 fee, 990 ft. from N line, 4,290 ft. from W line of 200-ac. tract, George Kerr Sur.
T.D. 3,648 ft.; comp. small well on pump.

Humble O. & R. Co.'s No. 2 Thompson, 466 ft. SW of SE cor. of J. C. Wood tract, 466 ft. SW on line parallel to E line, Wm. Burke Sur.
Cutting out drill pipe 5,405 ft.

Francis P. Hynes' No. 1 Theo. M. Plummer, 330 ft. from W line, 990 ft. from S line of Sec. 33, Theo. M. Plummer Subd.
Drlg. 1,550 ft.

Felmont Corp.'s No. 1 T. J. Ernest, 466 ft. from SE cor. of J. C. Madray 216-ac., thence 466 ft. NW along survey line, thence S of R/A 466 ft., Bee County School Sur.
Drlg. 5,200 ft.

Paul L. Meaders' No. 1 Emil Keller, in NE cor. of Keller tract, 330 ft. from N line, 330 ft. from E line, Sec. 28, of the M. Alcorte Sur.
S.D. 3,700 ft.

BEXAR COUNTY

Jones & Kieffer's No. 1 LaGrane, NW cor. of tract, 210 ft. each way, F. Rolen Sur. No. 48.
T.D. 1,010 ft.; bailed some 38.3 gravity oil; now fishing for bailer.

McPhee & Briggs' No. 1 F. Lamb, 9,200 ft. from S line, 800 ft. from W line of Sur. No. 3 (Manuel de Luna).
Drlg. hard sticky gumbo 1,985 ft.

Noble & Akins' No. 1 DeVilbiss.
T.D. 2,232 ft.; having trouble with heaving sand; showing little oil and gas.

Geo. O'Neil's No. 1 Holly Crouch, NW cor. of 150-ac. tract.
Dry and abd. 1,446 ft.

Carroll C. Raborn's No. 1 Claude McCauley, 150 ft. from N and NW lines of tract in Sec. 52, Wm. Harrison Sur.
T.D. 165 ft.; changing to rotary.

C. C. Raborn's No. 1 A. B. Stephens, 1,630 ft. from N line, 1,540 ft. from W line of tract, P. B. Hayes Sur. No. 3.
T.D. 415 ft.; moving in rotary.

CALDWELL COUNTY

Coffield & Lanning's No. 1 Franks, 150 ft. from N and E lines of S ½ of 131.6 acres, Edward Brown Sur.
3,100 ft.; no report.

Exploration Co.'s (F. Meyers) No. 1 W. T. Mooney, 810 ft. from S line, 450 ft. from W line of 95-ac. tract, S. Seal Sur.
Drlg. 1,455 ft.

Ogden & Reed Oil Co.'s No. 1 J. A. Compton, 450 ft. NE of NW line, 150 ft. SE at right angles out of NW cor. of P. Martines Sur.
Drlg. 450 ft.

DEWITT COUNTY

Stewart's No. 1 Kleberg, 630 ft. from W line and midway N and S lines of tract, Tommelson Sur.
210 ft.; shut down.

Sunray Oil Co.'s (S. S. Price et al) No. 1 Beuhrig, 330 ft. from N and E lines of Sec. 7, T.&N.O. Sur.
Temp. abd. 3,014 ft.

DUVAL COUNTY

Mills Bennett's No. 2 D.C.R.C., 1,200 ft. W of W cor. of Sur. 50, thence N 990 ft. in Sur. 258.
Coring 1,535 ft.

Intrepid Oil Co.'s No. 2 Parr, 330 ft. from N and W lines of 80-ac. tract, Sur. 115.
Drlg. 3,200 ft.

Henderson & Harvey's No. 1 Chernosky, 330 ft. from S line, 660 ft. from W line, Sur. 224.
T.D. 2,650 ft.; P.B. to 2,224 ft.; I.P. 100 bbls. per day.

Magnolia Pet. Co.'s No. 1 Bennett, 330 ft. from S and W lines of Sur. 441.
Drlg. 3,014 ft.

J. J. O'Byrne's No. 1 Ball, 330 ft. from S and W lines of Tract 3, Santas Flores grant.
Rigging up.

Santa Clara Oil Co.'s No. 1 Wood-Welder, 330 ft. from NE cor. of NW¼ of Sur. 385.
1,000 ft.; no report.

Texla Oil Co.'s No. 1 Hubbard, 990 ft. out of SW cor. of Sur. 84.
Drilled plugs 2,803 ft.; preparing to swab.

FAYETTE COUNTY

Ross Fenton's No. 1 Kasper (263-ac), 2,000 ft. from NE line, 1,280 ft. from SW line, of Thos. Green Sur. No. 28.
Checking titles.

FRIO COUNTY

W. T. Shoemaker's No. 1 M. Roche, 150 ft. SW cor. of Carl Wenzel Sur. No. 139.
Tested S.W. in Edwards; T.D. 3,700 ft.

GOLIAD COUNTY

Keystone Royalty Co.'s No. 1 M. Woods, SW part of county.
Moving in material.

GONZALES COUNTY

Southwestern Synd., Ltd.'s No. 1 W. S. Atkinson, 2,054 ft. from N line, 1,034 ft. from E line of 135-ac. tract in S. Y. Reams Sur. No. 51.
S.D. 5,700 ft.

(Continued on Page 102)

ROCKY MOUNTAIN RUNS

Estimated daily average production for the week ending May 11 follows:

WYOMING	
Salt Creek	17,290
Big Muddy	1,640
Badger Basin	30
Black Mountain	220
Byron	1,140
Dallas Derby	640
Dutton Creek	60
Elk Basin	40
Ferris	20
Frannie	130
Garland	1,550
Grass Creek	Shut in
Hamilton Dome	960
Hudson	270
LaBarge	1,000
Lance Creek	2,510
Lost Soldier	1,850
Mule Creek	Shut in
Midway	70
Notches	Shut in
Oregon Basin	2,020
Osage	740
Pilot Butte	20
Rex Lake	Shut in
Rock River	1,460
South Casper	Shut in
Poison Spider	70
Teapot	20
Total Wyoming	33,740
MONTANA	
Buckley-Border	270
Cat Creek	760
Cut Bank	4,770
Kevin-Sunburst	3,270
Lake Basin	50
Pondera	1,100
Total Montana	10,220
COLORADO	
Florence	270
Fort Collins and Wellington	410
Iles Dome	3,400
Moffat	420
Orchard	30
Rangely	80
Tow Creek	200
Total Colorado	4,860
NEW MEXICO	
Artesia	690
Cooper area	5,020
Eunice area	6,640
Hobbs	30,820
Hogback	200
Hospah	Shut in
Jal	3,420
Lea area	1,370
Maljamar	1,930
Rattlesnake	150
Table Mesa	90
Total New Mexico	50,330
Total Rocky Mountain region	99,150

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IN TEXAS—or wherever it gets hot—the storage of volatile oils is a serious problem. Many products which have to be handled by refineries, pipe lines and marketing companies, boil frequently if stored at atmospheric pressure. The evaporation loss under these conditions is staggering.

Boiling losses can be stopped, however, by storing volatile liquids in a Hortonspheroid. As the temperature rises, the vapor pressure increases but is resisted by the shell. For example, a Hortonspheroid designed to withstand 15 pounds per square inch gauge pressure will not allow boiling unless the temperature rises sufficiently to produce a vapor pressure of 30 pounds per square inch.

Hortonspheroids are economical storage units, their shapes being ideal for a combination of liquid load and internal vapor pressure. Remarkable savings can be made by low as well as high pressures. Standing storage losses from motor gasolines are eliminated by gauge pressures of 2 to 5 pounds per square inch. Spheroids can be built in standard sizes from 5,000 to 80,000 barrels, and for any pressures up to 20 pounds per square inch.

This is only one of several types of tanks and roofs which we build to stop evaporation loss under all conditions. Our specialized experience in evaporation engineering is at your disposal whenever you are considering storage units of any kind. Ask our nearest office for data on evaporation savings or cost estimates on tanks and roofs.

CHICAGO BRIDGE & IRON WORKS

Dallas 1241 Dallas Athletic Club Building
Houston . . . . . 2919 Main Street
Tulsa . . . . . 1606 Thompson Building
Birmingham 1536 North Fiftieth Street
Chicago . . 2128 Old Colony Building
Detroit . . . . 1514 Lafayette Building
Cleveland . . . 2204 Rockefeller Building
New York 3147-165 Broadway Building
Philadelphia 1615-1700 Walnut St. Building
Boston 1517 Consolidated Gas Building
San Francisco . . 1054 Rialto Building
Los Angeles . . . 1423 Wm. Fox Building

Fabricating plants in Birmingham, Chicago and Greenville, Pa.

Michigan Operators Are Awaiting Second Test in Crystal Township, Montcalm County, Area

By PAUL A. ELLIOTT
Staff Correspondent, Michigan Fields

MUSKEGON, Mich., May 13.—Michigan operators this week are tensely awaiting the anticipated completion of a second Dundee test in the new Crystal Township, Montcalm County, Field in a sort of "calm before the storm."

With about 20 of 70 projected tests in the new central Michigan area already drilling, two were in the Traverse limestone, or within 300 or 400 feet of the Dundee pay toward the close of the past week in the mad race for new production.

Taggart Brothers, Inc., of Big Rapids were still in the lead although changing from rotary to cable tools to complete their No. 1 Fred Smith, SW SW SW Section 1-10n-5w, Crystal Township, on a location about three-fourths of a mile east of J. W. Leonard and others' No. 1 Otto Durbin in Section 11, same township, the discovery well.

The Taggart-Smith well was drilling at about 2,900 feet with the Eastern Gulf Oil Co.'s No. 1 George W. Barger, SW SW SE Section 2, north offset to the discovery well, about 100 feet behind. Three or four others had reached the Marshall and 10 or 12 others were drilling in Crystal and Ferris Townships of Montcalm County or New Haven, Newark and Sumner Township, in the adjoining Gratiot County section.

Strike Big Gasser

Mammoth Petroleum Corp.'s No. 1 Fred J. Graham, SW SE SW Section 31-11n-4w, Sumner Township, about 1½ miles northeast of the discovery, struck a flow of gas estimated from 1,000,000 to 3,000,000 feet a day in the Michigan Stray sand above the Marshall at about 855 feet. Drilling continued toward the Dundee as in the Taggart-Smith and Gulf-Barger wells, each of which struck larger flows in the stray sand.

McClanahan Oil Co.'s No. 1 Flint, NW NW NW Section 11, Crystal Township, also struck a show of gas in the Stray sand but continued for oil.

Fifteen of 22 new permits issued by the state conservation department from May 1 to 8, inclusive, were for added locations in the Crystal area, 12 of them in Crystal Township and three in Ferris Township, Montcalm County.

Nine of the 12 new permits for locations in Crystal Township were taken out by the Crystal Syndicate, Inc., which has staked out 10 locations on a tract of 850 acres under lease to the syndicate headed by Frank V. McCallister, of Alma, Mich.

The nine permits were: No. 1 Hattie Drake, SW NW NE Section 3-10n-5w, and the No. 2 Drake, NW NW NE Section 3; the No. 1 Saul and Iva Denman, SE NE NE Section 13, and the No. 2 Denman, SW NE NE Section 13; the No. 1 Frank Yeomans, NE NW NW Section 14; the No. 1 William and Rettie McCracken, NE NW SE Section 9, and the No. 2 McCracken, NW NW SE Section 9; the No. 1 Roy Lute, NE NE SW Section 15, and the No. 2 Lute, NW NE SW Section 15. The No. 2 Youmans also has been staked out but not yet placed under permit on a location, NW NW NW Section 2.

Three other new Crystal Township locations under permit are: Stork Oil Co.'s No. 1 George A. and Etta G. Dickensin, SE SW SE Section 3; Rowmor Corp.'s No. 1 James Barger, NW NW NE Section 10, and James M. Snowden's No. 1 Wight heirs, NE NE NE Section 10.

The three Ferris Township, Montcalm County, permits for tests north of Crystal Township include the following: Burnstein Oil & Gas Corp.'s No. 1 Joseph Keel, SW SE SE Section 35-11n-5w; St. Louis Pipe & Supply Co.'s No. 1 Rosa Osterhaut, SW NW NW Section 36, same township, and W. J. Bernier's No. 1 William E. Strait, SW NW SW Section 35, also Ferris Township.

Operations already have been started on a number of these locations with the total locations in the new field expected to exceed 75 this week before the second test is completed. This sets a new record for Michigan where locations previously have more slowly followed actual drilling operations, except during the rush period in Porter Township, Midland County, after several extension wells were in, proving the territory where new permits were obtained.

Completions

Two new gas wells in Montcalm and Mecosta Counties, the one making about 3,000,000 feet a day open flow and the other gauged at 750,000 feet a day, were the most important completions in a list also including five small oil producers and seven dry holes in 11 townships of nine counties.

The Gassers

Both of the gas wells were in the vicinity of other production though both resulted in valuable extensions. Columbia Oil & Gas Co.'s No. 1 R. Freeman, SW SW SW Section 24-13n-8w, Hinton Township, Mecosta County, increased the aggregate potential of this newly developing area by 7,750,000 feet, topping the Michigan Stray sands at 1,305 feet and drilling to 1,313 feet.

Prudential Oil & Gas Corp.'s No. 1 Harry and Gertrude Hanson, C NE NW Section 1-11n-6w, Day Township, Montcalm County, near the Home Township oil field, made 3,000,000 feet a day in the Michigan Stray topped at 1,351 feet and drilled to 1,357 feet total.

The Prudential-Hanson is the first producer in Day Township and is located about 9 miles northwest of the Crystal oil pool. It is about 2 miles south of Cedar Lake and a south offset to the Allen Park Oil & Gas Co.'s No. 1 Stephens, brought in last fall with an open flow of 2,200,000 feet a day.

Ogemaw County

Largest and most important of the five small oil producers were two completed in West Branch Township, Ogemaw County.

Morris-Van Keuren Oil & Gas Syndicate's No. 3 Floyd Fisk, drilled into the upper Traverse formation about two years ago as Kirchoff and Schulty's No. 1 Fisk, made 65 bbls. in the first three hours and 156 bbls. in the first 24 hours. Dundee limestone was topped at 2,550 feet and drilling was suspended at 2,717 feet. It is located SW SE SE Section 20-22n-2e.

Allen Park Oil & Gas Corp.'s No. 1 DeCoster, NE NW SW Section 19, same township, made 40 bbls. a day at a total depth of 2,760 feet.

Gordon Oil Co.'s No. 1 Lally Brothers, NE NW SW Section 19, was swabbing at 2,661 feet and expected to make a commercial producer, although not completed. Arthur Morris' No. 1 Golf Club, SW SE SW Section 20, also was completing after shooting a good show of oil and gas in the Dundee instead of acid treating as in most other tests in this area.

Melling Oil & Gas Co.'s No. 2 State of Michigan, SW SE NW Section 6-21n-3e, Mills Township, same county, was completing in the upper Traverse with about 600 feet of oil in the hole, while J. W. Leonard and others' No. 1 Joseph and Catherine Heintz, SW NE NE Section 24-22n-1e, Ogemaw Township and County, was drilling into the Dundee after casing at 2,626 feet.

Midland County

The only completion in Midland County was the Mid-State Development Co.'s No. 1 John Bolen, NW SW NE Section 16-14n-2w, Greendale Township, which made about 80 bbls. a day in the Dundee topped at 2,512 feet, drilled to 3,592 feet and plugged back to 3,570 feet.

St. Louis Pipe & Supply Co. had about 600 feet of oil in the hole in the No. 1 Hoyt Brothers, SE NE NW Section 19-13n-1w, Porter Township, same county, topping the Dundee at 3,420 feet and drilling to 3,468 feet.

Three other Porter tests were nearing completion in the Dundee, including Theodore Oil Co.'s No. 7 J. W. Campbell, SE SE NW Section 17, drilling in after cementing casing; McClanahan Oil Co.'s No. 2 Northrup in Section 20, shut down waiting for casing at 3,422 feet, and Pure Oil Co.'s No. 4 Hoyt, in Section 17. Joseph Trever's No. 1 Mrs. F. Forbes, SE SW SW Section 22, continued testing the upper Traverse for oil but soon will be deepened to the Dundee.

Goll, Graves and Mechling, on their wildcat, No. 1 Oviatt estate, SW SE SW Section 24-16n-2e, Mills Township, was reported shut down in the Dundee but depths were withheld pending settlement of legal difficulties.

Saginaw and Gladwin

Smith Petroleum Co. brought in another small Berea producer in Birch Run Township, Saginaw County, the No. 3 Edward Parlberg, SW NW SE Section 20-10n-6e. This upper pay sand was struck at 1,526 feet and the well drilled to 1,535 feet making 10 bbls. a day initial. Chapin Oil & Gas Co.'s No. 1 Sutliff, Section 16-9n-1e, Chapin Township, Saginaw County, was shut down 46 feet in the Dundee but not yet completed.

Sun Oil Co. struck shows of oil and gas in the Dundee but not of major proportions in the No. 1 Mary T. Hines, C NW NE Section 31-17-1w, Tobacco Township, Gladwin County. The limestone was topped at 3,796 feet with a show of oil at 3,858 feet, gas from 3,871-80 feet and oil again from 3,881-92 feet, the latter oil show making 2 bailers an hour but not enough to be treated with acid. The hole had been drilled to 127 feet in or a total of 3,923 feet with no final decision as to what will be done.

M. F. Whitehill's No. 1 Spicer, N half SW NW Section 11-17n-2w, Beaverton Township, topped the Dundee at 3,863 feet and had been drilled 64 feet in with no show when the week closed.

"Dusters"

The seven dry holes included four in Isabella County and singles in Oceana, Lapeer and Clinton Townships.

Three of the four Isabella County "dusters" were completed unsuccessfully as Michigan Stray sand tests in Broomfield Township. Michigan Cities Natural Gas Co.'s No. 1 Leinaar, C SE NW Section 11-14n-6w, topped the Stray sand at 1,336 feet and was dry at 1,346 feet after having a show of about 100,000 feet a day but experiencing difficulties with casing.

Fletcher and Lehman's No. 1 Leo Gatehouse, C NE NE Section 2, same township, was dry at 1,349 feet, while the Chippewa Oil & Gas Co.'s No. 1 Mrs. Diehl was dry at 1,338 feet. All will be plugged and abandoned.

Wittmer and Andrews' No. 1 J. and Ella Ervin, C E half NE SW Section 13-15n-4w, topped the Dundee at 3,696 feet but was dry at 3,804 feet, or 108 feet in the limestone in the Rosebush area.

Morris Oil & Gas Co.'s No. 1 P. J. and Joseph Marthey, NW NE SE Section 19-15n-3w, Denver Township, in the Leaton Field, was the only successful Isabella County completion making 50 bbls. a day in the Dundee at a total depth of 3,654½ feet. It recently was purchased by the Morris company from the Michigan Gas & Oil Corp.

H. C. Nelson's No. 2 Viola Smith, NW NW NE Section 36-15n-17w, Hart Township, Oceana County, was dry in the Dundee at 2,400 feet after topping the limestone at 2,390 feet on a location about three-quarters of a mile northwest of a previous Dundee test in the Traverse Field of western Michigan.

Hadley Oil & Gas Syndicate's No. 1 H. Halpin estate, SE NE NE Section 36-7n-3e, Elba Township, Lapeer County, was dry and abandoned at 1,340 feet.

Elba-Duplain Oil Syndicate's No. 1 Archie L. Stratton, NW NW NE Section 4-8n-1w, Duplain Township, Clinton County, was dry in the Dundee and Monroe formations. Dundee was topped at 2,893 feet but the drill struck water at 2,987 feet. It was continued 57 feet into the Monroe to another water sand at 3,044 feet, where drilling was discontinued and the hole plugged.

Lupton Oil Co. also temporarily abandoned a location on the Ginevra and E. J. Rakestraw lease, SE SE SW Section 35-24n-3e, Rose Township, Ogemaw Township, and moved off a rig.

New Locations

In addition to the 15 Crystal area locations previously mentioned, seven others were placed under permit last week in seven townships of six counties.

The permits are: Wittmer Co., Inc.'s No. 1 A. A. Curtis, C N half NW SE Section 2-15n-4w, Isabella Township and County; Strange Oil & Gas Co.'s No. 1 George Spicer, SW NE NW Section 11-17n-2w, Beaverton Township, Gladwin County; Farwell Oil & Gas Co.'s No. 1 Fred Siegle-Farwell Mills & Elevator, NW SE SE Section 26-17n-5w, Surrey Township, Clare County; M. J. Ingold's No. 1 L. C. Quackenbush, SW NW SW Section 13-22n-13, Ogemaw Township and County; Durham & Jones and Joseph Molloy's No. 1 Stephen Forro, SE SW NE Section 13-21n-3e, Mills Township, Ogemaw County; Richard Hall's No. 4 Harris-Bond, NE NW NE Section 7-13n-1w, Porter Township, Midland County, and Smith Petroleum Co.'s No. 1 Alvin C. and Carrie C. Totten, SE NE SW Section 20-10n-6e, Birch Run Township, Saginaw County.

Properties of the Garfield Oil & Gas Corp. are now owned by the Burnstein Oil & Gas Corp. of Clare, Mich. T. F. Caldwell, Inc.'s permit taken out for the No. 1 G. Ingersoll in Crystall Township, Montcalm County, has been changed to No. 1 M. L. Johnson. Daily Crude Oil Co.'s new Hansen permit recently issued as the No. 1 should be changed to the

(Continued on Page 115)

Increase in Locations in the West Texas District; North Texas Aided by East Texas Drop

By L. E. BREDBERG
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., May 13.—Locations in the West Texas district increased to 23 during the week and 15 tests were completed. Seven of the locations were either wildcats or semi-wildcats, two being on the White and Baker ranch 9 miles west of the Yates Field, Pecos County, where Gulf Production Co. has one small shallow producer around which five dry holes have been drilled, two being abandoned last week. Gulf Production Co. staked location for No. 6 White and Baker this week, 3½ miles southwest of the discovery, in Section 94, Block 194, G.C. &S.F. Survey. Cardinal Oil Co., which drilled a dry hole offsetting the discovery, has staked location on its "E" lease in Section 45, Block Z, T.C. Railway Survey. The area does not appear promising at present.

Dobbs Oil Co. has staked location for a wildcat in southwestern Crane County on the Jax Cowden and others land, and is moving in material. Location is 330 feet from the south and east of the N half of Section 38, Block 1, H.&T.C. Survey, northwest of McCamey and near the Pecos River. Woodsfield Drilling Co. of San Angelo has the contract.

Kimble County

Wilcox Oil & Gas Co. has staked location for a 5,000-foot cable tool Ordovician test on its large block in Kimble County, and has moved in tools. Location is 200 feet from the north and east lines of Section 1, D.&P. Railway Survey. The company recently acquired lease on 8,500 acres more adjacent to the acreage it already held. This county is considered in the Edwards Plateau region and is one of the tier of counties on the eastern side of the West Texas district.

Scurry County

Magnolia Petroleum Co. has staked location for a wildcat on a block in northwestern Scurry County held for several years. Location is 1,630 feet from the north and 900 feet from the east lines of Section 342, Block 97, H.&T.C. Survey, on the J. W. Mooar lands. It is less than 1 mile south of a "duster" drilled by E. L. Smith Oil Co. in Section 379, given up as dry at a total depth of 4,650 feet. Showings were logged at 2,200, 2,500 and 2,800 feet.

Jones County

A wildcat in Jones County was staked by Ungren and Frazier this week in Block 5, M. Bueno Survey, on the King ranch, to try for production found to the east over the line in Shackelford County.

Wildcatters in Jones County have been having little luck of late, with three dry holes abandoned last week and three more this week. However they are comparatively shallow, 2,000 feet and 2,250 feet, and the digging is easy. Most of them are drilled in the northern part of the county where they have been seeking the sand found to the east in Shackelford County and the sand found in the Sayles Pool near Hawley.

Winkler County Extension

An interesting strike in Winkler County during the week was made in the Halley area east of Hendricks Field. Sun Oil Co.'s No. 1 Halley, Section 24, Block B-12, P.S.L. Survey, about 1½ miles northwest of the Halley discovery which opened a sandy lime trend drilling play running parallel to Hendricks Field, north and south, up to the Howe area, opened about the same time, and which may link with the Halley area, showed a gradual increase in the sandy lime pay after drilling cement plug at bottom of casing at 2,695 feet, and filled 1,800 feet with oil in drilling to 2,755 feet. It also made a 15-bbl. head on the morning of May 8, and is sure of making a producer. This extends the Halley area north in the direction of the Brown and Altman production south of Kermit and nearly half way between the Howe and Halley areas. This well adds to the belief the areas may be linked, but this will have to be proven as more wells, now preparing to drill and those drilling on intervening acreage, are completed on the trend. Some are of opinion it will not prove one continuous field paralleling the Hendrick Field, while others believe it will.

Sid Richardson's No. 1 Walton, wildcat, drilling northeast of Kermit, Winkler County, which recently created excitement and a royalty play when it struck gas, struck several million feet of sulphur gas at 2,924 feet this week. It is drilling below 2,950 feet in lime. Gulf Production Co. staked two wildcat locations on its large block a short distance southwest of the Walton test. The Walton test is drilling with loaded hole to prevent a blowout. It is credited with topping the brown lime section at 2,115 feet, the highest position in the county on structure, which enhanced its chances for making a producer.

McCulloch County

Cambrian Oil Co. (Brock and Seward) abandoned a shallow test 15 miles northeast of Brady and 5 miles east of the two gassers recently completed by George Poulter and others. The Cambrian test was dry at 763 feet. It is in Section 2, heirs of John Ware Survey. Elevation is 1,690 feet.

Reeves County

J. D. Goulette is to drill a wildcat in the NW¼ of Section 7, Block 58, P.S.L. Survey, western Reeves County, on a seismograph structure that extends farther north encompassing the Slack and others' locations in Section 20, Block 56, P.S.L. Survey. Another test is to be drilled on the topographical high, in Section 34, Block 56. Gulf Production Co. and Humble Oil & Refining Co. are well fortified with acreage along this high, Gulf holding a block for years east of the Slack test, and having purchased around the test and to the west. Other companies hold a large acreage throughout the county, in which several tests have been drilled and good showings of oil and gas made. The Slack test is seeking production from the Rustler-Castille contact and will be drilled deeper for the Delaware which pays off east in the Wheat Field, Loving County, adjoining Reeves County to the east.

Ector County Extension

International Petroleum Corp. of Fort Worth is still trying to clean out and complete No. 1 E. F. Cowden in Section 25, Block 44, Township 2s, T.&P. Survey, Ector County. This test is a little over a quarter mile east of Broderick and Calvert's lone producer and discovery well, and promises to make the second well in the pool, which will start an active development campaign by the leases held by the company. No. 1 Cowden topped the pay at 4,147 feet and drilled to 4,330 feet before shooting with 430 quarts from 4,147 feet to total depth. The hole bridged and the crew is cleaning out the hole 300 feet off bottom, heading every two hours.

Three tests in the northwest quarter of Ector County should be deep enough within the next 10 days to prove whether that corner of the county is to produce more wells where it now has two small producers, and if there is a chance for the present two widely separated producers to be linked by production. Empire Gas & Fuel Co.'s No. 1 Cummins, in Section 10, Block 45, Township 1n, T.&P. Survey, set casing and is shut down at 3,800 feet. Landreth Production Co.'s No. 1 Cowden heirs, in Section 18, Block 44, Township 1n, is drilling at 4,075 feet. Landreth Production Co.'s No. 2 Scharbauer, in Section 13, Block A, farther southeast of the company's discovery, is only drilling below 1,600 feet. Gulf Production Co.'s No. 1 Goldsmith, farther southeast in Section 10, Block 44, Township 1s, is down 4,125 feet on a large block held by the company and is one of the most interesting tests in the county.

RANGER AND WICHITA FALLS

Completions in the Wichita Falls district increased to 57 during the week. Archer, Wichita and Young Counties continue to lead in developments, but Montague and Cook County have been picking up during the past few weeks with more developments each week.

One factor that will help developments in the Wichita Falls district is the decline in overproduction in East Texas which had been taking markets from the Wichita Falls district's plants. Some of these plants are now starting operations again, with more expected to fire up as less gasoline is trucked into their territory. The same holds true in the Ranger district, especially in the towns served by plants in that district. Abilene refineries are now expecting to increase the runs to their plants.

Haskell County Wildcat

A. J. Hughes of Fort Worth has assembled 3,000 acres in southeastern Haskell County, and is preparing to sink a 2,000-foot test about 3 miles west of the small shallow Moody Pool on the Haskell-Throckmorton line. That pool is producing from the 1,750-foot pay, but the 2,000-foot test will have three sands, the Cook, Hope and Tannehill to test for production. Roy Reynolds worked the geology.

Galloway and Coleman of Kansas City are taking a block centering in the W. R. Rice Survey, 2 miles southwest of Rule, in Haskell County, and are to drill a 3,500-foot cable tool test.

Shackelford County

J. Shipp and others of Oklahoma are assembling a 5,000-acre block centering in T.E.&L. Survey No. 147, Shackelford County, and are to drill a 4,000-foot test within 120 days. Pitzer and West of Breckenridge are now drilling a similar deep test in the county.

Comanche County

C. F. Forester and others, of Abilene, have taken a 2,000-acre block centering in the north half of Section 43, Deaf and Dumb Asylum lands, and are to drill a 3,500-foot cable tool test in 60 days. This block and test is 1 mile north of Sipes Springs, in Comanche County, in the Ranger district.

Crude runs in the Wichita Falls district averaged 62,725 bbls. per day during the week, around 235 bbls. per day increase over the previous week.

PANHANDLE DISTRICT

There were 12 completions reported in the Panhandle district, 1 a deep dry hole in Childress County. Humble Oil & Refining Co. sank this test to 4,525 feet, the second deep failure on a block held on the Smith Brothers ranch about 22 miles northeast of the town of Childress.

Locations were staked for 18 tests, an increase of 2 over the previous week.

Smith Brothers, who have been drill-

(Continued on Page 98)

Wildcat Operations in West Texas

Week Ending May 11

ANDREWS COUNTY

Fuhrman Pet. Corp.'s No. 2 Ford, 440 ft. from S and 1,320 ft. from E, Sec. 16, Blk. A-42.
Drlg. 3,472 ft.

Honolulu & Llano Oil Co.'s No. 1-B Parker, 440 ft. from N and 1,650 ft. from E, Sec. 11, Blk. A-42.
Elev. 3,281 ft.; drlg. 2,306 ft.

Humble Oil & Ref. Co.'s No. 4 Means, 654 ft. from S and 1,997 ft. from W, Sec. 4, Blk. C-45.
Elev. 3,185 ft.; drlg. 3,778 ft.

Republic Prod. Co.'s No. 1 Boner-State, 2,200 ft. from S and 1,320 ft. from E, Sec. 25, Blk. A-43.
Drlg. 75 ft.

J. W. Tripplehorn's No. 1 Ogden, 330 ft. from S and 2,310 ft. from W lines of Sec. 6, Blk. A-46, P.S.L. Sur.
Elev. 3,211 ft.; moving in rotary.

Wahlenmaier et al's No. 1 Odessa Ranch Co., 1,320 ft. from N and E of Sec. 10, Blk. A-32, P.S.L. Sur.
Elev. 3,307 ft.; T.D. 1,400 ft.; underreaming.

Wahlenmaier et al's No. 1 Cox Estate, 1,320 ft. from N and W of Sec. 8, Blk. A-33.
Location.

BREWSTER COUNTY

F. C. Dodson's No. 1 Texas American Syndicate, 660 ft. from N and E, Sec. 66, Blk. 10, G.H.&S.A. Sur.
Fishing 950 ft.

Joiner et al's No. 1 McIntyre, 352 ft. from S, 2,390 ft. from E of Sec. 21, Blk. 352, W. M. Mitchell Sur.
S.D. 2,150 ft.

King & Franklin's No. 1 Gage Est., C Sec. 138, Blk. 22, G.H.&S.A. Sur.
Drlg. 941 ft.

G. H. Storey's No. 1 Wilson, 1,980 ft. from N and E lines of Sec. 3, Blk. 212, T.&St.L. Sur.
S.D. 765 ft.

S. G. Smith's No. 1 Decie, 2,490 ft. from S and E, Sec. 7, Blk. 1.
Drlg. 860 ft.

COCHRAN COUNTY

Kelsey's No. 1 Slaughter, C Labour 36, League 150, R.C.S. Lands.
Derrick.

West Texas Development Co.'s No. 1 Slaughter, near C of Labour 53, League 149, Randall Co. School Lands.
Derrick.

COKE COUNTY

Haggerty et al's No. 1 Gaston, 340 ft. from S and 654 ft. from W, Sec. 11, Jos. Young Sur. (old well deepening).
Drlg. 3,012 ft.

CRANE COUNTY

Cranfill Bros.' No. 1 Tubbs, 330 ft. from S and W of Sec. 11, Blk. B-37, P.S.L. Sur.
Elev. 2,536 ft.; drlg. 1,933 ft.

Dobbs Oil Co.'s No. 1 J. Cowden et al, 330 ft. from S and E of N half, Sec. 38, Blk. 1, H.&T.C. Sur.
Location.

Gulf Prod. Co.'s No. 10 Waddell, C NW ¼ Sec. 11, Blk. B-23.
Location.

Gulf Prod. Co.'s No. 1 Henderson, 1,313 ft. from S and 1,323 ft. from E, Sec. 3, Blk. B-23, P.S.L. Sur.
Elev. 2,778 ft.; drlg. 787 ft.

Gulf Prod. Co.'s No. 1 M. B. McKnight, 660 ft. from S and W, Sec. 9, Blk. B-21.
Elev. 2,679 ft.; drlg. 2,046 ft.

Gulf Prod. Co.'s No. 1 Waddell, C NW NW Sec. 4, Blk. B-27, P.S.L. Sur.
Rigging up heavy rotary 4,595 ft.

Magnolia Pet. Co.'s No. 1 Edwards, 330 ft.

(Continued on Page 100)

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New Tests in Anderson and Cherokee Counties; Fewer Completions in the East Texas Fields

By L. E. BREDBERG

DALLAS, Tex., May 13.—Four completions were reported for the East Texas district during the week and three locations were staked. Two completions were reported in the Cayuga Field, northwest Anderson County, one small shallow pumper in Falls County and one abandoned in Fannin County.

Gulf Production Co. staked another location in the Camp Hill Pool, 7 miles east of Palestine, Anderson County, a north offset to the company's discovery on the Davey and Royall farm. The new test is to be on the Southern Pine Lumber Co. 108.4-acre tract in the H. Main Survey. The company's No. 2 Robinson, in the D. Stilts Survey, about one-quarter mile west of the nearest producer, reported topped the Austin chalk at 4,640 feet and is drilling below 4,700 feet. Elevation is 636 feet, much higher structurally than the Maddox nearest producer.

Wildcat in Anderson County

H. L. Hunt and Sun Oil Co.'s No. 1 Alice Scott, in the Joseph Crawford Survey, Slocum area, southern Anderson County, is another dry hole. A drill stem test was made from 5,265-75 feet, 450 feet of salt water and 70 feet of mud showing in 10 minutes. It is to be cored and drilled 100 feet deeper.

Long Lake Area

Tide Water Oil Co. and Texas Seaboard Oil Co.'s No. 1 Smith, in the John Adams Survey, 2 miles north of the nearest producer, is shut down at 5,460 feet, the last 5 feet being porous grained white water sand. It is to be plugged back as a gasser. This extends the field north and proves more acreage to gas production.

Cayuga Field

Tide Water Oil Co. and Texas Seaboard Oil Co.'s No. 21-A Wills, in the S. Edmondson Survey, is down 7,900 feet. This is a Trinity sand test, by far the deepest drilled in the East Texas district. Peyton Brothers drilled a Trinity sand test to 6,116 feet in the Mexia Field, A. Varela Survey, but it failed to make a producer. They have plugged it back to 5,640 feet in an effort to produce a good showing, but it is pumping only salt water and showing little oil and gas. It will probably be abandoned.

Rusk Pool—Cherokee County

Wood and others' No. 1 New Birmingham Development Co., in the L. Jordan Survey, 810 feet southeast of the discovery, topped the Pecan Gap at 4,030 feet and is drilling below 4,075 feet. Elevation is 478 feet.

Wildcats

Another test is preparing to get under way in Cherokee County. Scott and Turpin have moved material on the Whiteman and Decker lands in the J. H. Armstrong Survey for a Woodbine wildcat, about 3 miles southeast of the Rusk discovery.

Keen and others have a derrick on the R. L. and W. M. Kelley farm in the E. Johnson Survey, 3 miles west of Ladonia, in Fannin County. These parties have been taking acreage in Fannin and Hunt Counties and will probably sink more than the one test.

Douglas Exploration Co. and Atlantic Oil Producing Co.'s No. 1 Hayter, in the De Los Santos Coy Survey, northwest of Nacogdoches, Nacogdoches County, is held up at total depth of 4,272 feet by the collapse of a joint of pipe at 681 feet. A string of casing is to be run to around 800 feet before drilling. This test may be carried down in quest of Trinity sand production if Woodbine sand production is not found.

Blackwell Oil & Gas Co.'s No. 1 J. F. Malone, in the J. Balch Survey, 2½ miles southeast of the Van Field, Van Zandt County, is preparing to make a drill stem test at 3,630-65 feet in gray sandy shale. No shows of oil or gas have been encountered.

About 2 miles northwest of Arp, H. H. Rowland and Frank D. Staples of Tyler are to sink a Woodbine test on a block centering in the Thomas C. Williams Survey.

Stebenger and Baker are to drill on a block in the southeastern part of the A. Cherino Survey, centering in the F. Atkinson tract, 20 miles south and east of Nacogdoches in Nacogdoches County.

EAST TEXAS FIELD

Of 95 completions in the East Texas Field four were pumpers, one was abandoned in Rusk County and one was completed swabbing. Dry holes, pumpers and swabbers are the result of stepping out on the very edges of the field in an effort to prove more acreage or extend the field, which has been done for several months, especially on the east side where there is no danger of drilling into water. The north and northwest side has also been extended a considerable distance, and although the well may not prove much more than marginal wells, which have an allowable of only 20 bbls. per day, the owners feel the extra drilling will prove profitable. In some cases on the northwest edge the tests are drilled into water, but plugging back and shutting off this water generally results in the completion of some kind of a well, if not more than a marginal one. Many tests drill only 1 foot or a few more of sand to prevent drilling into water and causing a plugging back job, but 1 foot of sand in this field often results in producing a good well; for instance: Luttes and others' No. 3 Register, in Gregg County, was completed this week for 32 bbls. in 32 minutes through tubing choke. It topped the sand at 3,692 feet and drilled in only 1 foot before completing.

Lane Drilling Co.'s No. 3 Tyiska, in the R. Wilson Survey, Smith County proved a 60-bbl. per hour well through tubing choke, although it showed water when drilled to 3,820 feet or 3,324 feet below sea level. It was plugged back 4 feet to shut off the water before completing. Striking of water is no reason for immediate abandonment for plugging back has been successful in nearly every test drilled into water, and those wells producing for a long time in the Gladewater area, western Gregg County, prove plugging back is worth while as the majority of these wells have produced water as a result of heavy withdrawals, necessitating plugging back to continue producing.

Bottom Hole Pressure

The East Texas Engineering Association reports a weighted average bottom hole pressure of 1,217 pounds for the field as of May 1. This is the same as April 1, consequently the field shows that a daily average product of around 475,000 bbls. per day without showing a decline in pressures, and the pressure report bears out his statement.

COMPLETIONS IN EAST TEXAS

Gregg County

Amerada Petroleum Corp.'s No. 10 Bumpus, top sand 3,546 feet, total depth 3,575 feet, initial production 16 bbls. in 15 minutes; No. 14 Continental Bank, top sand 3,572 feet, total depth 3,595 feet, initial production 16 bbls. in 15 minutes. Arkansas Fuel Oil Co.'s No. 9 Calvin, top sand 3,524 feet, total depth 3,549 feet, initial production 31 bbls. in 15 minutes; No. 5-A McPherson, top sand 3,559 feet, total depth 3,584 feet, initial production 32 bbls. in 15 minutes; No. 5 Whatley, top sand 3,518 feet, total depth 3,543 feet, initial production 25 bbls. in 15 minutes. Atlantic Oil Producing Co.'s No. 61 Hay, top sand 3,488 feet, total depth 3,531 feet, initial production 134 bbls. per hour; No. 72 Judge, top sand 3,501 feet, total depth 3,528 feet, initial production 136 bbls. per hour; No. 77 Judge, top sand 3,507 feet, total depth 3,528 feet, initial production 125 bbls. per hour; No. 13 Lee, top sand 3,578 feet, total depth 3,630 feet, initial production 140 bbls. per hour.

Barnsdall Oil Co.'s No. 15 Adams, top sand 3,605 feet, total depth 3,635 feet, initial production 85 bbls. per hour; No. 16 Adams, top sand 3,611 feet, total depth 3,626 feet, initial production 92 bbls. per hour. Beard and others' No. 9 Fuller, top sand 3,669 feet, total depth 3,692 feet, initial production 10 bbls. per hour pumping. Farrell & Co.'s No. 2-A Christian, top sand 3,608 feet, total depth 3,628 feet, initial production 90 bbls. per hour. Bond's No. 4 Webb, top sand 3,565 feet, total depth 3,586 feet, initial production 60 bbls. in 30 minutes. Clark and Cowden's No. 9 Christian, top sand 3,640 feet, total depth 3,665 feet, initial production 90 bbls. per hour. Gulf Production Co.'s No. 63 Judge, top sand 3,497 feet, total depth 3,512 feet, initial production 60 bbls. per hour; No. 69 Judge, top sand 3,496 feet, total depth 3,512 feet, initial production 58 bbls. per hour. Henderson's No. 1 Church Lot, top sand 3,531 feet, total depth 3,556 feet, initial production 30 bbls. in 30 minutes. House and others' No. 1 Smith, top sand 3,619 feet, total depth 3,642 feet, initial production 400 bbls. in 20 hours.

Humble Oil & Refining Co.'s No. 8 Adams, top sand 3,467 feet, total depth 3,492 feet, initial production 77 bbls. per hour. Jones and O'Brien's No. 7 McHaney-Loeb, top sand 3,496 feet, total depth 3,557 feet, initial production 33 bbls. in 20 minutes. Magnolia Petroleum Co.'s No. 11-B Christian, top sand 3,631 feet, total depth 3,660 feet, initial production 60 bbls. per hour. Navarro Oil Co.'s No. 11 Harris, top sand 3,509 feet, total depth 3,539 feet, initial production 50 bbls. per hour. New Process Oil Co.'s No. 8 Anderson, top sand 3,488 feet, total depth 3,526 feet, initial production 35 bbls. in 30 minutes. Producers Petroleum Corp.'s No. 2 Texas & Pacific Railway, top sand 3,627 feet, total depth 3,636 feet, initial production 90 bbls. per hour. Selby Oil & Gas Co.'s No. 9-A Snavely, top sand 3,552 feet, total depth 3,567 feet, initial production 28 bbls. in 30 minutes through 1-inch choke.

Shell Petroleum Corp.'s No. 18 King, top sand 3,536 feet, total depth 3,610 feet, initial production 40 bbls. in 40 minutes. Skipper and Biven's No. 4 McGride, top sand 3,632 feet, total depth 3,654 feet, initial production 60 bbls. per hour. Yount Lee Oil Co.'s No. 13-A Davis, top sand 3,602 feet, total depth 3,622 feet, initial production 60 bbls. per hour through eleven-sixteenths inch choke; No. 7-A Whatley, top sand 3,489 feet, total depth 3,509 feet, initial production 55 bbls. per hour through eleven-sixteenths inch choke. Arkansas Fuel Oil Co.'s No. 20 Ross, top sand 3,559 feet, total depth 3,584 feet, initial production 17 bbls. in 15 minutes. Atlantic Oil Producing Co.'s No. 14-B Hughey, top sand 3,577 feet, total depth 3,616 feet, initial production 100 bbls. per hour. Droppleman Drilling Co.'s No. 3-A Martin, top sand 3,727 feet, total depth 3,729 feet, initial production 80 bbls. in 30 minutes.

Empire Gas & Fuel Co.'s No. 2 Taylor, top sand 3,669 feet, total depth 3,681 feet, initial production 28 bbls. in 15 minutes. Gulf Production Co.'s No. 30 Alexander, top sand 3,540 feet, total depth 3,568 feet, initial production 65 bbls. per hour; No. 14 Watson, top sand 3,564 feet, total depth 3,591 feet, initial production 70 bbls. per hour. Hensley's No. 2-B Bell, top sand 3,675 feet, total depth 3,677 feet, initial production 50

East Central Texas Wildcats

Week Ending May 11

CAMP HILL AREA—ANDERSON COUNTY

Gulf Prod. Co.'s No. 1 Southern Pine Lumber Co., 330 ft. out of SE cor., H. Main Sur.
Derrick.

Gulf Prod. Co.'s No. 2 W. Robinson, 380 ft. from S and 330 ft. from E of 100-ac. tract, 50 ft. N of No. 1, D. Stilts Sur.
Top Pecan Gap 3,982-4,276 ft.; drlg. 4,372 ft.

CAYUGA AREA—ANDERSON COUNTY

Clark-Cowden's No. 1 Barton, 650 ft. N and S and 199 ft. E and W lines of 9.86-ac. lease, T. Bristow Sur.
Base Austin 3,655 ft.; top sand 4,087 ft.; T.D. 4,115 ft.; set csg.

Hunt & Son Oil Co.'s No. 1 Scott, 1,196 ft. from N and 830 ft. from W lines, Jos. Crawford Sur.
Austin 5,053-5,217 ft.; top Woodbine 5,264 ft.; top sand 5,266 ft.; T.D. 5,275 ft.; to test.

J. W. Luttes' No. 1 C. McKee, 2,640 ft. from N line of lease and survey and 330 ft. from W line of McKey 800-ac. tract.
Derrick.

Tide Water-Seaboard's No. 1 J. Smith, John Adams Sur., 668 ft. W of E line and 467 ft. N of S line of 41-ac. tract (Long Lake area).
Coring 5,356 ft.

Tide Water Oil Co. et al's No. 21-A Wells, 4,079 ft. N and 2,333 ft. W of lease, S. Edmondson Sur. (Trinity test).
Drlg. 7,800 ft.

BOWIE COUNTY

Tex-Ark. Oil Co.'s No. 1 Hamilton Estate, 600 ft. E and 350 ft. N lines, J. Milan Sur., 4 miles S of Red River.
Drlg. 610 ft.

CHEROKEE COUNTY

H. A. Baker et al's No. 1 T. Smith, 630 ft. S and 660 ft. W of SW cor. of W. A. Newton's 360-ac. tract, 2½ miles N of Jacksonville, J. Pineda Sur.
Derrick.

Scott & Turpin's No. 1 Whiteman & Decker, 450 ft. N and 150 ft. W, J. H. Armstrong Sur.
Material.

Jacksonville O. & G. Co.'s No. 1 H. D. Henderson, 660 ft. from N and W lines of 40-ac. tract out of Tankersley 104-ac. tract, 5 miles NE of Jacksonville, J. Pineda Sur.
S.D. 693 ft.

Ponta Oil Co.'s No. 1 C. W. Darby, 1,944 ft., S and 630 ft. W of East Cyrus Parks Sur., 2¼ miles S of Summerfield.
Top Austin 4,416 ft.; drlg. 4,578 ft.

Wilson Stubbs Oil Co.'s No. 1 Rowborts, 450 ft. from S line, 150 ft. from W line of 100-ac. tract, 2 miles SW of Jacksonville, J. D. Wolfin Sur.
S.D. 1,553 ft.

T. J. Woods et al's No. 3 New Birmingham Dev. Co., 150 ft. out of SE cor. of 160-ac. tract, 810 ft. SE of No. 1, L. Jordan Sur.
Elev. 478 ft.; drlg. 2,628 ft.

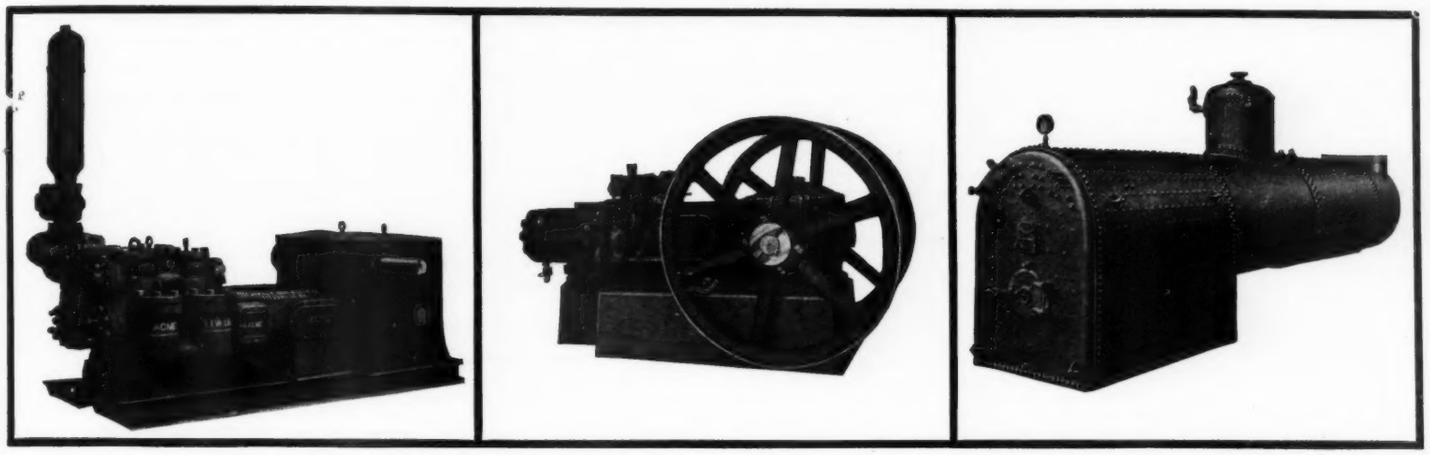
ELLIS COUNTY

Murphee & Coker's No. 1 Coker, 2,900 varas

(Continued on Page 100)

"You may imitate, but you should never counterfeit"

—Balzac.



The New Acme Power Slush Pump

The New Tico Type "C" Heavy Duty Full Diesel Oil Engine

The New Acme 90" Firebox Boiler

Our Research Engineers have designed these units after 4 years of careful study.

We hope they will not be counterfeited as so much of our machinery has been.

Some manufacturers are actually claiming parts of our standard and original designs as special features. This we object to and take this means of clarifying our position before the Industry.

Our Engineers have worked diligently to design these units and are entitled to the rights of the originator and pioneer.

THE TITUSVILLE IRON WORKS CO.

TITUSVILLE, PA.

Established 1860

bbls. per hour. Invincible Oil Co.'s No. 8 Williams, top sand 3,638 feet, total depth 3,646 feet, initial production 150 bbls. per hour. Iowa-Payne Oil Co.'s No. 5 Walker, top sand 3,653 feet, total depth 3,658 feet, initial production 65 bbls. per hour. Kilgore Refining Co.'s No. 9 I.&G.N.R.R., top sand 3,552 feet, total depth 3,604 feet, initial production 40 bbls. per hour. Lacey's No. 6 Adkins, top sand 3,654 feet, total depth 3,658 feet, initial production 105 bbls. per hour. Landes' No. 1 Watson, top sand 3,533 feet, total depth 3,565 feet, initial production 30 bbls. per hour.

Luttes and others' No. 3 Register, top sand 3,692 feet, total depth 3,693 feet, initial production 32 bbls. in 30 minutes. Magnolia Petroleum Co.'s No. 13 Cole, top sand 3,561 feet, total depth 3,565 feet, initial production 112 bbls. per hour; No. 10 Hughey, top sand 3,524 feet, total depth 3,540 feet, initial production 104 bbls. per hour; No. 2 Paotha, top sand 3,552 feet, total depth 3,640 feet, initial production 84 bbls. per hour. O. K. Oil Co.'s No. 2 Well, top sand 3,720 feet, total depth 3,721 feet, initial production 10 bbls. in five minutes through three-eighths inch choke. Producers Investment Co.'s No. 2 Rowland, top sand 3,542 feet, total depth 3,595 feet, initial production 30 bbls. in two hours swabbing. Riley's No. 3-A Mitchell, top sand 3,572 feet, total depth 3,615 feet, initial production 20 bbls. in 20 minutes. Shell Petroleum Corp.'s No. 12 Bates, top sand 3,544 feet, total depth 3,617 feet, initial production 40 bbls. per hour. Sun Oil Co.'s No. 11 Brown, top sand 3,627 feet, total depth 3,674 feet, initial production 55 bbls. per hour. Tide Water Oil Co.'s No. 24 Barton, top sand 3,548 feet, total depth 3,590 feet, initial production 60 bbls. per hour.

Rusk County

Gulf Production Co.'s No. 18 Florence, top sand 3,760 feet, total depth 3,766 feet, initial production 30 bbls. per hour through three-quarters inch choke; No. 13 Jernigan, top sand 3,653 feet, total depth 3,664 feet, initial production 56 bbls. per hour through three-quarters inch choke; No. 3 Palmer, top sand 3,575 feet, total depth 3,591 feet, initial production 60 bbls. per hour. Harrison and Abercrombie's No. 3-B Brightwell, top sand 3,584 feet, total depth 3,611 feet, initial production 75 bbls. in 30 minutes. Navarro Oil Co.'s No. 18 Brightwell, top sand 3,623 feet, total depth 3,653 feet, initial production 14 bbls. in 15 minutes. Republic Production Co.'s No. 6 Scroogin, top sand 3,677 feet, total depth 3,683 feet, initial production 10 bbls. in 10 minutes. Snowden and McSweeney's No. 21 Laird, top sand 3,584 feet, total depth 3,601 feet, initial production 90 bbls. per hour.

Stanolind and Crosby's No. 5 Morsie, top sand 3,573 feet, total depth 3,648 feet, initial production 28 bbls. in 23 minutes. Tide Water Oil Co.'s No. 15-A Bean, top sand 3,580 feet, total depth 3,631 feet, initial production 60 bbls. per hour through 1-inch choke. Amerada Petroleum Corp.'s No. 20 Stovall, top sand 3,618 feet, total depth 3,647 feet, initial production 45 bbls. in 40 minutes. Brown's No. 2 Tipps, top sand 3,544 feet, total depth 3,630 feet, initial production 20 bbls. per hour pumping. Combined Oil Interests' No. 27 Eaton, top sand 3,725 feet, total depth 3,741 feet, initial production 80 bbls. per hour. Dearing & Son's No. 9 Finney, top sand 3,612 feet, total depth 3,719 feet, junked and abandoned; No. 2 McDavid, top sand 3,674 feet, total depth 3,733 feet, initial production 22 bbls. per hour.

Delta Drilling Co.'s No. 3-B Henson, top sand 3,540 feet, total depth 3,650 feet, initial production 10 bbls. per hour pumping. DeMontrond Oil Co.'s No. 7 Pinkston, top sand 3,603 feet, total depth 3,621 feet, initial production 120 bbls. per hour. Fisher's No. 1 Eaton heirs, top sand 3,710 feet, total depth 3,790 feet, initial production 75 bbls. per hour. Humble Oil & Refining Co.'s No. 8 Barton, top sand 3,727 feet, total depth 3,751 feet, initial production 92 bbls. per hour; No. 39 Blackwell, top sand 3,693 feet, total depth 3,703 feet, initial production 98 bbls. per hour; No. 40-A Plowman, top sand 3,697 feet, total depth 3,728 feet, initial production 75 bbls. per hour. Hunt Production Co.'s No. 13-C Ashby, top sand 3,550 feet, total depth 3,666 feet, initial production 22 bbls. in 90 minutes pumping; No. 5 Barksdale, top sand 3,670 feet, total depth 3,721 feet, initial production 24 bbls. in 15 minutes; No. 12-B Bradford, top sand 3,610 feet, total depth 3,695 feet, initial production 22 bbls. in 80 minutes pumping.

Stroube and Collins' No. 9 Pinkston, top sand 3,642 feet, total depth 3,675 feet, initial production 50 bbls. per hour. Texas Co.'s No. 17 Bank of Overton, top sand 3,722 feet, total depth 3,760 feet, initial production 65 bbls. per hour. Venable and McClanahan's No. 29 Birdwell, top sand 3,598 feet, total depth 3,631 feet, initial production 80 bbls. in 30 minutes; No. 31 Birdwell, top sand 3,600 feet, total depth 3,640 feet, initial production 80 bbls. in 30 minutes.

Smith County

Cole and others' No. 1 Moore, top sand 3,871 feet, total depth 3,872 feet, initial production 70 bbls. per hour. Florence Oil Co.'s No. 2 Cole, top sand 3,769 feet, total depth 3,770 feet, initial production 130 bbls. in two hours. Gulf Production Co.'s No. 7 Alford, top sand 3,805 feet, total depth 3,807 feet, initial production 20 bbls. per hour through three-quarters inch choke. Hinton's No. 2 Jackson, top sand 3,813 feet, total depth 3,817 feet, initial production 30 bbls. in 20 minutes. Lane Drilling Co.'s No. 3 Tyiska, top sand 3,843 feet, total depth 3,847 feet, initial production 60 bbls. per hour. Prince Brothers' No. 2 Arterbury, top sand 3,841 feet, total depth 3,843 feet, initial production 50 bbls. per hour. Reeves', receiver for Big Indian, No. 8 Wofford, top sand 3,710 feet, total depth 3,716 feet, initial production 75 bbls. per hour. Sun Oil Co.'s No. 25 Knight, top sand 3,627 feet, total depth 3,637 feet, initial production 68 bbls. per hour; No. 11-B Pace, top sand 3,782 feet, total depth 3,783 feet, initial production 15 bbls. per hour through casing. Sanders' No. 1 Cole, top sand 3,850 feet, total depth 3,851 feet, initial production 75 bbls. per hour. Wise's No. 4 Cook, top sand 3,739 feet, total depth 3,746 feet, initial production 60 bbls. in 30 minutes.

Upshur County

Delta Drilling Co.'s No. 1 Brawley, top sand 3,764 feet, total depth 3,774 feet, initial production 30 bbls. in 15 minutes. Galvez Oil Co.'s No. 8 Holland, top sand 3,662 feet, total depth 3,675 feet, initial production 30 bbls. in 40 minutes. Phillips' No. 4 Starr, top sand 3,618 feet, total depth 3,627 feet, initial production 60 bbls. per hour. Stroube and Stroube's No. 22 Mackey, top sand 3,649 feet, total depth 3,652 feet, initial production 30 bbls. in 45 minutes. Texas Co.'s No. 4 Culpepper, top sand 3,742 feet, total depth 3,748 feet, initial production 27 bbls. per hour.

Anderson County—Cayuga Area

Roeser and Pendleton's No. 1 Wathen, top sand 4,066 feet, total depth 4,094 feet, initial production 6 bbls. per hour through one-quarter inch choke. Elevation is 328 feet. Tide Water Oil Co.'s No. 12 Edens, total depth 4,060 feet, initial production 90 bbls. in 14 hours through one-eighth inch choke.

Falls County

A. L. Britton and others' (Schuh and others) No. 1 St. Clair, total depth 1,073 feet, initial production 8 bbls. in 10 hours.

Fannin County

Wilson, Moore and Smith's No. 1 Rogers, dry and abandoned at 632 feet.

West Texas Fields

(Continued from Page 94)

ing in many wells in Wheeler County and other producing areas in the Panhandle, have staked location for a wildcat on the Pierce lands in Section 107, Block 21, H.&G.N. Survey, several miles north of Quail in Collingsworth County. Material has been moved in. One other test is drilling in this county and one is ready to spud.

Texas Co. has staked location for No. 8 Les K. Johnson, near the western Foard County line, but in the J. A. Smith Survey, Cottle County. This test is west of the company's three high gravity producing wells on the Johnson lands in Foard County, and the second test in the Cottle County side. The former test on this side of the county line proved dry.

Wheeler County Failure

Bell Oil & Gas Co.'s No. 2 Evans-Gulf, has apparently defined the northwest edge of the prolific Wheeler County granite wash producing area by proving dry at a total depth of 2,503 feet after striking salt water. This county has been one of the most active in the Panhandle with many large producers completed each week. However, many of the wells rapidly decline in potential, and the Railroad Commission has planned a graduated scale for cutting back their daily allowables. The commission is to hold a hearing at Amarillo to discuss this phase of proration.

NORTH TEXAS COMPLETIONS

Baylor County

W. N. Alexander and others' No. 1 W. H. Portwood, total depth 1,392 feet, top pay 1,378 feet, initial production 135 bbls. in 24 hours. Consolidated and Petroleum Producers' No. 3-D W. H. Portwood, total depth 1,378 feet, top pay 1,365 feet, initial production 200 bbls. per day.

Archer County

A. R. Dillard's No. 2 B. G. Hasson and others, total depth 1,540 feet, dry and abandoned. Fain-McGaha Oil Corp.'s No. 1-C L. F. Wilson, total depth 1,600 feet, dry and abandoned. F. H. E. Oil Corp.'s No. 6 F. Brazina and others, total depth 1,445 feet, oil sand 1,433-45 feet, initial production 14 bbls. per day; No. 7 F. Brazina and others, total depth 1,445 feet, top pay 1,433 feet, initial production 30 bbls. per day; No. 6 W. T. Richardson, total depth 1,441 feet, top pay 1,431 feet, initial production 35 bbls. per day; No. 9 W. T. Richardson, total depth 1,440 feet, top pay 1,433 feet, initial production 8 bbls. per day. Foster and others' No. 1 S. L. Scott, total depth 1,245 feet, dry and abandoned. W. B. Hamilton's No. 26 W. Pace, total depth 1,161 feet, top pay 1,152 feet, initial production 75 bbls. per day. W. E. Maxson and Panhandle Refining Co.'s No. 36-B F. C. Green, total depth 1,098 feet, top pay 1,079 feet, initial production 25 bbls. per day; No. 37-B F. C. Green, total depth 1,102½ feet, top pay 1,084½ feet, initial production 28 bbls. per day.

Magee and Stipe's No. 4 William Justice, total depth 1,082 feet, top pay 1,070 feet, initial production 5 bbls. of oil and show of water per day. Peery and Boller and others' No. 1 W. T. Richardson, total depth 1,460 feet, dry and abandoned; No. 3 W. T. Richardson, total depth 1,443 feet, top pay 1,435 feet, initial production 10 bbls. per day. Perkins and Cullum's No. 14 C. L. Abercrombie, total depth 1,228 feet, top pay 1,216 feet, initial production 30 bbls. per day; No. 164 Falls, total depth 1,196 feet, top pay 1,181 feet, initial production 7 bbls. per day; No. 168 Falls, total depth 1,161 feet, top pay 1,142 feet, initial production estimated 70 bbls. per day; No. 170 Falls, total depth 1,094 feet, top pay 1,075 feet, initial production estimated 30 bbls. per day; No. 171 Falls, total depth 1,155 feet, top pay 1,132 feet, initial production estimated 60 bbls. per day; No. 172 Falls, total depth 1,107 feet, top pay 1,087 feet, initial production 15 bbls. per hour swabbing and flowing. Petroleum Producers' No. 1 L. W. McCrory, trustee (Wilson), total depth 1,565 feet, dry and abandoned. Ray and Staniforth's No. 1 W. T. Richardson, total depth 1,467 feet, dry and abandoned; No. 5-B T. B. Wilson, total depth 1,608 feet, top pay 1,604 feet, initial production 75 bbls. per day. Florey Oil Co.'s (formerly G. Y. Rogers and others) No. 3 F. Brazina and others, total depth 1,440 feet, top pay 1,429 feet, initial production 30 bbls. per day. R. O. Rogers and others' No. 1 J. Darilek, total depth 1,444 feet, top pay 1,435 feet, initial production 32 bbls. per day. White and Duncan's No. 5-B S. Webb, total depth 722 feet, top pay 717 feet, initial production 5 bbls. per day.

Denton County

Christie Brothers and Grant's No. 1 J. H. Hughes, total depth 1,245 feet, dry and abandoned.

Jack County

G. B. Gaines and others' No. 3 W. H. Smith, total depth 293 feet, dry and abandoned.

Montague County

O. V. Beck's No. 17 C. L. Davenport and others, total depth 1,696 feet, plugged back to 1,690 feet, top pay 1,679 feet, initial production 173 bbls. of oil and 5 bbls. of water per day. Benton and Holmes' No. 8-B C. L. Davenport and others, total depth 1,692 feet, top pay 1,685 feet, initial production estimated 400 bbls. per day swabbing; No. 2 W. A. Reed, total depth 1,732 feet, plugged back to 1,727 feet, top pay 1,720 feet, initial production 75 bbls. per day. Bourland and Gannon's No. 4 Mrs. F. E. Loy (old well deepened from 800-foot sand), total depth 910 feet, top pay 890 feet, initial production 25 bbls. per day.

Wichita County

Bonner Oil Co.'s No. 6 Watkins, total depth 856 feet, top pay 845 feet, initial production 10 bbls. per day. Burk Royalty Corp.'s No. 8 Allen and Kemp, total depth 846 feet, dry and abandoned. J. H. Cottom and others' No. 1 Chilson estate, total depth 798 feet, dry and abandoned. Flynn Brothers' No. 1 W. C. Williams, total depth 768 feet, dry and abandoned. Horwitz and Oldham's No. 2 D. E. Hooks, total depth 1,186 feet, top pay 1,170 feet, initial production 30 bbls. per day. Texas Co.'s No. 21 Allen and Kemp, total depth 469 feet, top pay 457 feet, initial production 2 bbls. of oil and 1 bbl. of water per day; No. 15 J. H. Marriott (old well deepened from 1,541 feet), total depth 2,073 feet, dry and abandoned. United Oil Corp.'s No. 15 L. P. Douglas, total depth 821 feet, dry and abandoned.

Wilbarger County

Hegralle Oil Co.'s No. 12-A Waggoner estate, total depth 1,879 feet, top pay 1,869 feet, initial production 339 bbls. per day. T. Medders and others' No. 1 Waggoner estate, total depth 2,475 feet, dry and abandoned. Riner and Massie and others' No. 13-A Waggoner estate, total depth 1,876 feet, top pay 1,861 feet, initial production 350 bbls. per day. A. B. Wharton, Jr.'s No. 5-A Waggoner estate, total depth 1,887 feet, top pay 1,878 feet, initial production 25 bbls. per day.

Young County

Dinny Oil Co.'s No. 1 R. J. McCloud, total depth 923 feet, dry and abandoned. Clara Mae Douglas' No. 4 Finch estate, total depth 651 feet, top pay 640 feet, initial prdouction 70 bbls. per day. B. N. Honea's No. 1 W. L. Groves, total depth 970 feet, dry and abandoned. C. B. Long and others' No. 2 H. C. McKinney, total depth 963 feet, dry and abandoned. Martin and Hines' No. 1 J. Bullock, total depth 675 feet, plugged back to 589 feet, top pay 580 feet, initial production 9 bbls. per day. Mook-Texas Oil Co.'s No. 1-B Jeffery estate, total depth 888 feet, dry and abandoned. Rathke Oil Co.'s No. 10 C. E. Graham, total depth 914 feet, top pay 909 feet, initial production 25 bbls. per day. E. R. Riggs' No. 3-C B. H. Larrimore, total depth 673 feet, dry and abandoned. Texas Co.'s No. 8-B Finch estate, total depth 672 feet, top pay 643 feet, initial production 10 bbls. per day. Westheimer and Daube's No. 12 B. Larrimore and others, total depth 703 feet, plugged back to 653 feet, top pay 648 feet, initial production 8 bbls. per day. L. A. Long and others' No. 1 R. A. Kutch, total depth 1,707 feet, top pay 1,705 feet, initial production 28 bbls. per day flowing through choke. McLester Oil Co.'s No. 1

A. C. Owens, total depth 3,260 feet, dry and abandoned.

WEST TEXAS COMPLETIONS

Crane County

Continental Oil Co.'s No. 3-C Cowden, top pay 2,345 feet, total depth 2,560 feet, shot with 360 quarts from 2,370-2,545 feet, initial production 15 bbls. per day, pumping.

Glasscock County

Luce and Pickens' No. 3 Turner, top pay 2,289 feet, total depth 2,291 feet, initial production 39 bbls. per day, pumping.

Howard County

Shasta Oil Co.'s No. 1 Dodge estate, top pay 2,568 feet, total depth 2,821 feet, shot with 400 quarts from 2,568-2,780 feet, initial production 281 bbls.

Jones County

Dr. C. E. Johnson's No. 1 W. T. Young, dry and abandoned at 2,003 feet. B. O. Shappell's No. 1 Steele, dry and abandoned at 2,250 feet. Robb and Brewer and others' No. 1 Evans, dry and abandoned at 2,020 feet.

McCulloch County

Brock and Seward s (Cambrian Oil Co.) No. 1 McCall, dry and abandoned at 763 feet; elevation 1,690 feet; heirs of John Ware No. 2 Survey.

Pecos County

Stanolind Oil & Gas Co.'s No. 12-B Tippett, top pay 447 feet, total depth 451 feet, initial production 36 bbls. of oil and 12 bbls. of water per day.

Upton County

Williams' No. 1 Robbins, dry and abandoned at 400 feet.

Ward County

Texas Pacific Coal & Oil Co.'s No. 9 James, top pay 2,439 feet, total depth 2,560 feet, shot with 30 quarts from 2,430-50 feet, initial production 12 bbls. per day. Richardson's No. 20-B Johnson, top pay 2,350 feet, total depth 2,588 feet, initial production 491 bbls.; No. 21-B Johnson, top pay 2,408 feet, total depth 2,590 feet, initial production 494 bbls. per day. California Co.'s No. 5 Gordon, top pay 2,336 feet, total depth 2,552 feet, initial production 1,097 bbls.

Winkler County

Richardson's No. 2-G Scarborough, top pay 2,862 feet, total depth 3,010 feet, initial production 193 bbls. Sinclair Prairie Oil Co.'s No. 3 Cummins, top pay 2,850 feet, total depth 2,960 feet, shot with 40 quarts from 2,860-2,910 feet, initial production 261 bbls. per day.

PANHANDLE COMPLETIONS

Carson County

Hagy and others' No. 4 Barnard, top pay 2,555 feet, total depth 2,745 feet, initial production 35,000,000 feet gas. McClintock and others' No. 3 Jordan and Brown, total depth 3,144 feet, plugged back to 3,139 feet, shot 20 quarts from 3,125-39 feet, initial production 14 bbls. oil and 8 bbls. water per day pumping.

Childress County

Humble Oil & Refining Co.'s No. 1-A or 2 Smith, dry and abandoned 4,525 feet.

Gray County

Dixon Creek Oil & Refining Co.'s No. 4 Benedict, top pay 3,229 feet, total depth 3,288 feet, initial production 441 bbls. per day pumping. Stanolind Oil & Gas Co.'s No. 2 Culler, top pay 3,189 feet, total depth 3,304 feet, initial production 573 bbls. per day pumping.

Hutchinson County

Huber Petroleum Co.'s No. 4-C Johnson, top pay 3,068 feet, total depth 3,075 feet, initial production 419 bbls. per day on gas lift.

Wheeler County

Triplex Oil Co.'s No. 1 Plummer, top pay 2,468 feet, total depth 2,478 feet, initial production 39 bbls. per day. Helena Oil & Gas Co.'s No. 3 Keller, top pay 2,390 feet, total depth 2,481 feet, initial production 2,807 bbls. per day. Skelly Oil Co.'s No. 3 Johnson, top pay 2,425 feet, total depth 2,480 feet, initial production 2,488 bbls. per day. Smith Brothers' No. 1 Setter, top pay 2,477 feet, total depth 2,532 feet, initial production 3,950 bbls. per day. Texas Co.'s No. 11 Keller, top pay 2,450 feet, total depth 2,535 feet, initial production 2,501 bbls. per day.

Gas Contract Committee of the N.G.A.A. Reports

(Continued from Page 46)

for gas testing 1.50 G.P.M. on a 5 cent market which gives a gross value of 7.5 cents. Although there is a difference of 40 per cent of the gross value of the product, the percentage we pay remains the same. Many other such inconsistencies could be pointed out.

Last year about this time a general meeting of all contract men of the Mid-Continent area was called to discuss a curve prepared by Mr. Rhodes of the Gulf Production Co., to replace our present schedule. As a result of that meeting a sub-committee composed of Mr. E. C. LeFevre, Empire Oil & Refining Co., Mr. M. T. Kirk, Phillips Petroleum Co. and Mr. C. A. Franks, Amerada Petroleum Corp., was appointed to do further work along this line. Mr. Kirk was unable to do any work himself so reassigned it to Mr. E. Buddrus of his company. These three gentlemen have performed their task in a very intelligent manner and reported to the Gas Contract Committee two suggested substitutes. One of these is a percentage schedule which reduces the breaking points from 5 per cent to 1.25 per cent. It also gives a more equitable distribution to the sales price factor and the gasoline content factor. The second suggested substitute is in the form of a series of curves which reduces the percentage breaks still more, that is, down to 1 per cent except when the gasoline content and the sales price are both high, when the percentages increase by two for each bracket. I shall not go into further details regarding these two proposals for the reason that we have not yet been able to give them the attention that they require before making a definite recommendation. It is our hope that the Gas Contract Committee will be able to send immediately to all interested parties photostats of this schedule and this curve for study. We hope you will give them your most careful attention.

Last year in our report your attention was called to a fight that we were making in conjunction with the Mid-Continent Oil & Gas Association against some new regulations issued by the secretary of the interior with respect to measuring and paying for gas from restricted Indian and Public lands. We are sorry to report that the secretary has held against us on all five points involved in that controversy. So, unless we are successful on appeal, you will have to measure all your gas from Indian and Public lands on the basis of 10 ounces. This will apply regardless of whether it is casinghead, dry or residue gas. You will also have to consult with the local representative of the U. S. Geological Survey as to whether you will be allowed boosting cost or even to use residue gas emanating from these lands in the operation of your gasoline plant without paying for it. The major inequity of this decision will require that the lessee pay royalty on the full net proceeds derived from the sale of any residue gas rather than on 50 per cent of it. In other words, the lessee will have to dig down into his pockets and pay royalty on something that he has not received. It is quite likely that a part of this increased cost will be passed on to the gasoline manufacturer.

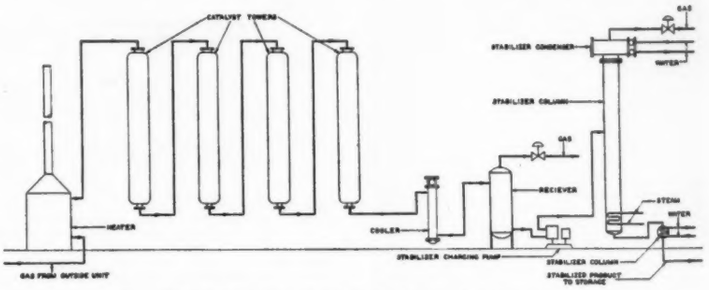
The committee has also been lending its assistance to the Mid-Continent Oil & Gas Association in the formation of a standard contract form covering the purchase and sale of dry gas. While progress is being made, sufficient advancement has not been made to justify any further report.

Polymer Gasoline Has Higher Blending Value

(Continued from Page 32)

square inch gauge pressure. The yields of liquid polymer ranged from 3.0 to 8.4 gallons per 1,000 cubic feet with olefin polymerizations of 71 to 99 per cent.

The outstanding characteristic of polymer gasoline is its high octane number and blending value. Its distillation range can vary considerably without affecting its antiknock qualities, and it has higher blending value than either benzene or iso-octane, although its straight octane number is lower, 81 versus 97 and 100, respectively. The oxygen bomb stability of polymer gasoline is low but its inhibitor susceptibility is high.



Simplified flow chart of gas polymerization process

TABLE 17—OCTANE BLENDING VALUE OF POLYMER GASOLINE

(A) Polymer Gasoline Blends					
Per cent of Polymer gasoline in blend	5	10	15	20	25
Octane blending value:					
In 45 Octane No. base fuel	125	125	121	120	117
In 55 Octane No. base fuel	125	120	115	113	111
In 65 Octane No. base fuel	105	105	105	105	103
(B) Benzene Blends					
Per cent of benzene in blend	5	10	15	20	25
Octane blending value:					
In 45 Octane No. base fuel	84	85	84	84	86
In 55 Octane No. base fuel	84	85	88	90	89
In 65 Octane No. base fuel	84	85	88	90	91
(C) Iso-octane Blends					
Per cent of iso-octane in blend	5	10	15	20	25
Octane blending value:					
In 45 Octane No. base fuel	94	94	94	96	96
In 55 Octane No. base fuel	90	91	95	98	99
In 65 Octane No. base fuel	90	90	95	97	97

(D) Straight Octane Numbers

Polymer gasoline	81
Benzene	97
Iso-octane	100

TABLE 18—OCTANE RATINGS OF BLENDS OF POLYMER AND STRIGHTRUN GASOLINES

Polymer gasoline in blend, per cent	100	0	5	10	15	25
Straightrun gasoline in blend, per cent.	0	100	95	90	85	75
Octane No. of blend (C.F.R. M.M.)	80	44	48	52	56	62

TABLE 19—OCTANE RATINGS OF BLENDS OF POLYMER AND REFORMED GASOLINES

Polymer gasoline in blend, per cent	100	0	5	10	15	25
Reformed gasoline in blend, per cent	0	100	95	90	85	75
Octane No. of blend (C.F.R. M.M.)	80	72	73	74	75	76

TABLE 20—DISTILLATION CHARACTERISTICS OF GASOLINES USED IN BLENDING

	Gasolines		
	Polymer	Straightrun	Reformed
	(100 cc. A.S.T.M. distillation)		
	° F.	° F.	° F.
Initial B.P.	138	142	122
5	178	174	149
10	193	190	163
20	208	207	185
30	218	220	203
40	228	237	220
50	239	249	236
60	251	255	252
70	272	266	270
80	296	283	290
90	327	304	318
Endpoint	390	360	366

TABLE 21—CRUDE POLYMER

	1	2	3	4
Gravity	65 9	68.0	68.1	67.8
Gum, mg./100 cc. (C. D.)	15	34	38	44
Gum, mg./100 cc. (A.S.T.M.)	4	11	6	8
Induction period, minutes	35	60	50	45
Ind. per. + 0.01% wood dist. inhibitor	...	260	205	305
Ind. per. + 0.025% wood dist. inhibitor	235	660	510	595
Ind. per. + 0.05% wood dist. inhibitor	430	1030	835	845
Per cent sulphur, total	0.77	0.02	0.02	0.04
Per cent sulphur, mercaptan	0.54	0.002	0.007	0.006
Octane number (C.F.R.M.M.)	80	80	81	81
Octane blending value (25% in fuel A-3; O.N., 44; C.F.R.M.M.)	114	116	120	120
Reid vapor pressure	9.4	10.8	10.5	8.6
100 cc. A.S.T.M. Distillation				
	°F.	°F.	°F.	°F.
Init. B.P.	115	100	102	107
Per cent dist.				
5	146	125	148	132
10	160	143	156	152
20	184	177	178	180
30	199	193	196	196
40	209	203	205	206
50	219	211	214	212
60	232	221	222	219
70	254	236	243	235
80	294	266	270	261
90	337	326	336	326
Endpoint	409	418	418	409
Total per cent over	94 5	97.0	97.0	97.0
Per cent bottoms	1.5	1.4	1.5	1.5
Per cent loss	4.0	1 6	1.5	1.5

Domestic Demand at New Record in Quarter

(Continued from Page 28)

only 7,000,000 bbls. despite the large gain in motor fuel inventories and smaller gains in crude oil and some of the other refinery products. Many statisticians have pointed to the steady decrease in fuel oil stocks over the past year as the most favorable development in operations pointing to improved marketing conditions. These stocks were considered excessive for several years especially on the West Coast. If withdrawals continue the fuel markets should advance and because of the direct relationship to other products in refinery operations, oil markets generally would benefit. It is assumed that the April figures of the government and later months will show a seasonal decline in fuel oil demand.

Other Products

The March report throws additional light on the slump in kerosene prices. The domestic demand for the quarter was slightly ahead of 1934 but the decline in exports more than offset this increase so that the total demand was less. Supplies on the other hand were 15 per cent greater than the first quarter of 1934 resulting in a situation in which the stocks on March 31 were 37 per cent greater than on the same date in 1934.

The lubricating oil situation so far as the entire country is concerned is in better balance than the other products. Both the export and domestic demand is running ahead of last year by small percentages and the increase in production has been small. There was a small withdrawal from storage the first quarter. There has been some improvement in the export movement of wax but the supplies continue to exceed the demand as they have consistently over the past 15 months.

March, 1935 and 1934

The following table summarizes the March, 1935, and 1934, operations (data in barrels daily):

	March		
	1935	1934	1935
Crude runs to stills	2,472,000	2,316,000	+156,000
Gasoline:			
Production	1,178,000	1,076,000	+102,000
Domestic demand	1,032,000	959,000	+ 73,000
Exports	84,000	82,000	+ 2,000
Kerosene:			
Production	168,000	148,000	+ 20,000
Exports	17,000	22,000	— 5,000
Domestic demand	128,000	136,000	— 8,000
Gas oil and fuel oil:			
Production	899,000	899,000	.....
Imports	25,000	28,000	— 3,000
Exports	76,000	81,000	— 5,000
Domestic demand	976,000	1,044,000	— 68,000
Lubricants:			
Production	73,000	69,000	+ 4,000
Exports	25,000	26,000	— 1,000
Domestic demand	52,000	53,000	— 1,000
Petroleum wax (lbs.):			
Production	1,201,000	1,391,000	—190,000
Imports	60,000	94,000	— 34,000
Exports	716,000	683,000	+ 33,000
Domestic demand	673,000	710,000	— 37,000
Total all oils:			
Total supply	2,880,000	2,656,000	+224,000
Total demand	2,798,000	2,751,000	+ 47,000

PORT LAVACA PIPE LINE

HOUSTON, Tex., May 13.—The Texas Pipe Line Co. is laying a pipe line from Markham in Matagorda to the Port Lavaca Field in Calhoun County to handle its production. The line is reported to be 6-inch and will be approximately 40 miles long. The line will connect to the company's line at Markham, and will be taken to Houston by the way of West Columbia.

It is reported that a pipe line is to be laid from the Bruni Field in Webb County to Port Isabel. The line will be constructed by the American Liberty Oil Co. or R. W. Fair.

East Central Texas Wildcats

(Continued from Page 96)

along S line of grant from river and 1,700 varas N at R/A, R. De La Pena Sur.
S.D. 1,544 ft.

FANNIN COUNTY

B. F. Allen's No. 1-B Argo, center of 16½-ac. tract in J. G. Swisher Sur., 1 mile S of Ector.
Rig on ground.

Keen et al's No. 1 R. L. and W. M. Kelley, 660 ft. from E and 480 ft. W, E. Johnson Sur., 2 miles W of Ladonia.
Derrick.

FREESTONE COUNTY

Hoover et al's No. 1 McFall, 150 ft. S and W lines, S. Garrison Sur., E of Mexia.
Location.

GREGG COUNTY

O. T. Clark's No. 1 Williams, 2,100 ft. from S and 2,400 ft. from W of D. Hill Sur., 3 miles NE of Longview.
T.D. 3,771 ft.; bailing.

HENDERSON COUNTY

Great State's No. 1 Ansley, 1,724 ft. W and 300 ft. S of SE cor. of M. Matthews Sur., N. H. T. Thompson Sur.
S.D. 3,315 ft.

H. M. Wilson's No. 1 fee, 970 varas S of NE cor. of 943-ac. tract, 5 miles N of Malahoff.
Derrick.

HOPKINS COUNTY

D. A. Hale et al's No. 1 L. M. Hall, 200 ft. from N and E lines of 70-ac. tract, 1 mile SE of Miller Bros. A. Caro Sur.
S.D. 2,950 ft.

HUNT COUNTY

Cauble & Thompson's No. 1 Reed, 330 ft. N of northerly NE cor. of C. B. Payne Sur., but in F. Thweatt Sur., 3 miles SE of Greenville.
T.D. 3,416 ft.; reaming.

J. F. Morrissey & Co., Inc.'s No. 1 Fry, 543 ft. from N and 200 ft. from E of 146-ac. tract, 7 miles N of Commerce, C. Davis Sur.
Derrick.

H. G. Samson's No. 1 Phillips, 1,200 ft. E of Winan's No. 1 Phillips, University Lands Sur., 2 miles W of Commerce.
Elev. 522 ft.; drlg. 2,137 ft.

KAUFMAN COUNTY

Germany et al's No. 1 Clark, 951 ft. N and 1,000 ft. W of tract, S. Eden Sur.
Washing to botton; T.D. 1,780 ft.

Murry & Emerson's No. 1 G. W. Martin, 1,660 ft. from W and 250 ft. from N of 140-ac. tract, from W. L. C. Butler Sur., 2 miles NE of Kemp.
S.D. 27 ft.

L. P. Kean's No. 1 J. B. Hunter, R. Sowell Sur., 300 ft. from SW and 150 ft. from SE of 50-ac. tract, 4 miles S of Terrell.
S.D. 3,400 ft.

LEON COUNTY

Killough & Tucker's No. 1 G. W. Lee, center of NE 10 acres of 230-ac. tract, J. Burleson Sur.
Moving in rig.

LIMESTONE COUNTY

J. Edward Mills' No. 1 Hunt, 200 ft. from N, 350 ft. from W line 34.75-ac. tract, Israel Wood Sur., 3 miles NE of Kosse.
T.D. 3,637 ft.

C. F. Carter's No. 1 Dean, 660 ft. from SE and 330 ft. from SW lines of 75-ac. tract, P. Valella Sur., 3½ miles SW of Mexia.
T.D. 1,758 ft.

Doughtry et al's No. 1 S. Welch, 150 ft. from NW and 900 ft. from NE of 77.64-acre tract in A. Varilia Sur., 4 miles W of Groesbeck.
Top sand 2,940-51 ft.; S.D. 3,004 ft.

McLENNAN COUNTY

Mahan et al's No. 1 Mann, 1,100 ft. W of Simms Oil Co.'s No. 1 Mann, Carlos Tampo Sur., W of Robertsonville.
Drlg. 728 ft.

NACOGDOCHES COUNTY

A. D. Boyd's No. 1 Mattaner, 400 ft. S and 1,000 ft. E of J. A. Cherino Sur., near Cherino.
Location (a mine test).

Douglas Exploration Co.'s No. 1 Hayter, 1,687 ft. from S and 2,582 ft. from W lines of tract, Santos Coy Sur.
Coring 4,272 ft.

Morrow et al's No. 1 C. B. Watkins, 150 ft. from N line and 330 ft. from NW lines of 160-ac. tract, 3 miles S of Caro, H. Y. Bailey Sur.
S.D. 4,170 ft.

NAVARRO COUNTY

Bennett Brothers' No. 1 T. E. Stewart, 150 ft. from NE line of lease, 10 miles SW of Corsicana, Wm. R. Bowen Sur.
T.D. 1,186 ft.; S.D.

R. B. Codding et al's No. 1 Lela Kent, 450 ft. from S line and center of N and S lines of lease, 3 miles NE of Chatfield, C. B. Emmons Sur.
S.D. 1,340 ft.

W. J. Keeling et al's No. 1 J. F. Rushing 484 ft. from N line and 150 ft. from W line of 184-ac. tract, 6 miles SW of Richardson, Henry Ford Sur.
T.D. 2,881 ft.

McCullough et al's No. 1 C. Berry, 330 ft. from SE cor. of 35-acre tract, 1 mile W of Dawson, William Moss Sur.
S.D. 1,182 ft.

E. M. Thomason & Co.'s No. 1 C. Morgan, 340 ft. from W and 520 ft. from N of 100-ac. tract, Wm. Haggard Sur., 1 mile SW of McGlothlin's No. 1 Dobbin.
Rigged up.

Wiggins et al's No. 1 Donoho, 450 ft. from N and 1,101 ft. from E lines in John Couple Sur., SW of Corsicana.
S.D. 1,439 ft.

RED RIVER COUNTY

Dinger's No. 1 W. T. Norris, 1,000 ft. from S and 1,900 ft. from W of 400-ac. tract, Jos. Guest Sur., 1 mile S of Detroit.
S.D. 1,861 ft.

Joiner's No. 1 D. Rust, C. C. Wilborn Sur., 234 ft. N and 254 ft. W of most southerly SE cor. of Sur., just south of Avery.
Rig.

RUSK COUNTY

Ben Lamb's No. 1 H. Leath, 330 ft. out of NW cor. of 185-ac. tract in L. J. Dooley.
S.D. 4,725 ft.

Richardson's No. 1 Wood.
Derrick.

SMITH COUNTY

Cloud et al's No. 1 Dendall, 330 ft. from S and W of 55-ac. tract, J. Williams Sur., 3 miles E of Van Field.
S.D. 1,650 ft.

W. R. Harrison's No. 1 Rushing, J. Herring Sur. (O.W.D.D.).
T.D. 4,330 ft.; S.D.

TITUS COUNTY

S. Rotondi's No. 1 Lillianstun, 1,200 ft. E from NW cor. of J. Bodt Sur. and 330 ft. N, but in W. H. Crawford Sur., 5 miles NE of Talco.
Elev. 301 ft.; derrick.

UPSHUR COUNTY

T. D. Humphries' No. 1 C. Nations, Inc., SW cor. 3-ac. tract, R. Aher Sur., 1½ miles N of Ore City.
Drlg. 2,402 ft.

VAN ZANDT COUNTY

Blackwell Oil Co.'s No. 1 J. F. Malone, 1,760 ft. from S and 330 ft. from E, J. Balch Sur., 2½ miles SE of Van.
Drlg. 3,138 ft.

J. H. Foster et al's No. 1 Breucher, 330 ft. out of SE cor. of tract, D. Clapp Sur., 4 miles SE of Wills Point.
Drlg. 3,145 ft.

J. Beren et al's No. 1 Bryant, 483 ft. N of same operator's dry hole, Nacogdoches County School Land Sur.
W.O.S.R. 1,325 ft.

Beren et al's No. 2 Palmer, 544 ft. from S and 686 ft. from E of 69.5-ac. tract, Nacogdoches County School Land.
T.D. 1,324 ft.

Peden & Olson's No. 5 Brannon, 150 ft. from N and W, Nacogdoches Co. School Lands.
Drlg. 560 ft.

West Texas Wildcats

(Continued from Page 94)

from S and 1,650 ft. from E, Sec. 2, Blk. B-23.
Elev. 2,778 ft.; drlg. 260 ft.

CROCKETT COUNTY

Leslie-Hiller et al's No. 1 Todd, 1,200 ft. N and 330 ft. E, Sec. 26, Blk. WX, G.C.& S.F. Sur.
S.D. 580 ft.

Humble Oil & Ref. Co.'s No. 1 Couch, C NW Sec. 3, Blk. QR, G.C.&S.F. Sur.
Temporarily abnd. 1,881 ft.; elev. 2,538 ft.

CULBERSON COUNTY

Anderson-Prichard Oil Corp., Magnolia Pet. Co. et al's No. 1 Borders, 1,255 ft. N and 2,305 ft. from W, Sec. 34, Blk. 69, P.S.L. Sur.
Drlg. 1,279 ft.

Miller Bros.' No. 1 fee, 1,900 ft. from N and 660 ft. from E line of Sec. 21, Blk. 97, P.S.L. Sur.
S.D. 2,137 ft.; slight show gas here.

Wood et al's No. 1 Hall, 250 ft. from S and 85 ft. from E, Sec. 11, Blk. 54½, 16 miles N of Van Horn, P.S.L. Sur.
S.D. 246 ft.

DAWSON COUNTY

Adams & Turner's No. 1 John Robinson, 1,320 ft. from N line, 1,320 ft. from W line of Sec. 46, Blk. M, E.L.R.R. Sur.
T.D. 4,860 ft.; to abandon.

O. F. Dickinson, trustee's No. 1 C. H. Dooks, 368 ft. from S and 330 ft. from E of SW cor., Sec. 4, Blk. H, E.L. Ry. Co. Sur.
Location.

ECTOR COUNTY

Atlantic Oil Prod. Co.'s No. 1 T. P. Land Trust, 440 ft. from N and W of SE Sec. 11, Blk. 43, Twp. 1s, T.&P. Sur.
T.D. 4,391 ft.; plugged back to 4,255 ft.; swabbed 18 bbls. in 4 hrs., 25 per cent water.

Barnsdall Oil Corp.'s No. 2 Smith, 330 ft. from S and W lines of Sec. 1, Blk. 43, Twp. 1s, T.&P. Sur.
Elev. 3,064 ft.; drlg. 3,897 ft.

W. A. Black & Sons' No. 2 Connell, 330 ft. from S and 1,310 ft. from W lines of Sec. 1, Blk. B-16, P.S.L. Sur.
Drlg. 3,529 ft.; 2,000 ft. oil in hole.

Callahan et al's No. 1 Connell, 330 ft. from N and 990 ft. from W, Sec. 10, Blk. 30, Twp. 1s.
T.P. 3,515 ft.; T.D. 3,642 ft.; cleaning out after shot; swabbed and flowed 180 bbls. in 24 hrs.

Empire Gas & Fuel Co.'s No. 1 Cummins, 440 ft. from S and E, Sec. 10, Blk. 45, Twp. 1n, T.&P. Sur.
T.D. 3,800 ft.; set csg.

Gulf Prod. Co.'s No. 1 Goldsmith, C of NW Sec. 10, Blk. 44, Twp. 1s, T.&P. Sur.
Drlg. 4,125 ft.

International Pet. Corp.'s No. 1 Cowden, 660 ft. from S and E, Sec. 25, Blk. 44, Twp. 2s, T.&P. Sur.
T.P. 4,147 ft.; fishing and cleaning out; T.D. 4,330 ft.

Landreth Prod. Co.'s No. 1 Blakeney, 440 ft. from N and E, Sec. 28, Blk. 43, Twp. 1n, T.&P. Sur.
Cellar.

Landreth Prod. Co.'s No. 1-B O. B. Holt, 660 ft. from N and 1,980 ft. from E lines of Sec. 19, Blk. "A," P.S.L. Sur.
Drlg. 3,387 ft.

Landreth Prod. Co.'s No. 1 Cowden Heirs, 440 ft. from S and W, Sec. 18, Blk. 44, Twp. 1n, T.&P. Sur.
Top lime 3,708 ft.; drlg. 4,075 ft.

Landreth Prod. Co.'s No. 2 Scharbauer, 2,200 ft. from N and 440 ft. from W, Sec. 13, Blk. A, P.S.L. Sur.
Elev. 3,142 ft.; drlg. 1,625 ft.

Penrose et al's No. 1 Kloh & Rumsey, 2,310 ft. from S and E, Sec. 31, Blk. 45, Twp. 1s, T.&P. Sur.
Elev. 3,154 ft.; S.D. 4,505 ft.; to abandon.

C. L. Peters' No. 1 Connell, 330 ft. from N and E lines of NW of Sec. 12, Blk. B-16, P.S.L. Sur.
S.D. 837 ft.

EL PASO COUNTY

Tri-State Oil Co.'s No. 1 Kinkel, 190 ft. from N and 550 ft. from E, Sec. 237, A.T.&S.F. Sur.
S.D. 225 ft.; setting csg.

FISHER COUNTY

George Callihan et al's No. 1 Herring, 2,310 ft. from S and 330 ft. from W lines of Sec. 192, Blk. 1, B.B.B.&C. Sur.
Elev. 1,804 ft.; T.D. 2,345 ft.; crooked hole.

Tide Water Oil Co. et al's No. 1 W. E. Hittson et al, 1,320 ft. from N and 660 ft. from W, Sec. 177, Blk. 2, H.&T.C. Sur.
Drlg. 572 ft.

GARZA COUNTY

N. L. Richards' No. 1 Sullivan, 330 ft. from N and W, Sec. 3, Blk. 5, K. Aycock Sur.
Elev. 2,534 ft.; drlg. 2,477 ft.

GLASSCOCK COUNTY

John I. Moore et al's No. 1 J. S. McDowell, 1,980 ft. from N line and 660 ft. from E line of Sec. 22, Blk. 34, Twp. 2s, T.&P. Sur.
Topped lime 9,471 ft.; show oil and gas 9,484-9,520 ft.; increase oil 9,594-9,600 ft. and 9,633-55 ft.; T.D. 9,946 ft.

HOWARD COUNTY

Clay Bros. & White's No. 1 Read, 330 ft. frcm S and 1,650 ft. from W, Sec. 46, Blk. 30, Twp. 1n, T.&P. Sur.
Drlg. 2,555 ft.

John I. Moore et al's No. 1 Snyder, 330 ft. from S and W, Sec. 28, Blk. 30, Twp. 1s, T.&P. Sur.
Elev. 2,302 ft.; S.D.

Iron Mountain Oil Co.'s No. 6 Reed, 330 ft. from S and W lines of Sec. 46, Blk. 30, Twp. 1n, T.&P. Sur.
Drlg. 2,546 ft.

Slagel's No. 1 Foster, 990 ft. from S and 330 ft. from W, Sec. 43, Blk. 29.
T.D. 3,013 ft.; plugged back to 2,760 ft.; Putting on pump.

JEFF DAVIS COUNTY

C. M. Joiner's No. 1 Jones & Coffield, 770 ft. from N and 1,322 ft. from E. Sec. 8, Blk. 3, H.&T.C. Sur.
S.D. 1,105 ft. (corrected).

JONES COUNTY

Campbell et al's No. 1 Rowell, in E half of W half, Sec. 6, T.&P. Sur.
T.D. 950 ft.; fishing.

Campbell et al's No. 1 Enevill, 1,400 ft. from N and 270 ft. from W, Sec. 2, M.E.&P. Sur., ½ mile S of Anson.
Drlg. 2,320 ft.

Owen et al's No. 1 Johnson & Dunwoody, 3,750 ft. from S and 330 ft. from W. Sec. 6, Blk. 17, T.&P. Sur.
Spudded and S.D.

Sandyridge Oil Co.'s No. 1 P. Jones, 660 ft. from S and W of NW¼, Sec. 5, Blk. 15, T.&P. Sur.
Drlg. 1,806 ft.

Ungren & Frazier et al's No. 1 Steele, 1,450 ft. from S and 200 ft. from W lines of Sec. 8, Blk. 10, C. Allen Sur.
Drlg. 1,712 ft.

Ungren & Frazier's No. 1 King Ranch, 200 ft. from N and E of NW half, Blk. 5, M. Bueno Sur.
Spudded.

KIMBLE COUNTY

Wilcox Oil & Gas Co.'s No. 1 J. Patterson, 200 ft. from N and E, Sec. 1, D.&P.R.R. Sur.
Standard tools.

LOVING COUNTY

D. C. Evans' No. 1 W. D. Johnson, 2,310 ft. from N and 1,650 ft. from W, Sec. 13, Blk. 57, Twp. 1, T.&P. Sur.
Drlg. 2,100 ft.

Mason Oil Co.'s No. 1 Kyle, 1,980 ft. from S and E, Sec. 22, Blk. 55, Twp. 1, T.&P. Sur.
T.D. 1,525 ft.; to standardize.

LYNN COUNTY

Hart Oil Co.'s No. 1 Edwards, 220 ft. from N and 200 ft. from W of SE Sec. 29, L.&S.V. Sur.
Elev. 3,112 ft.; drlg. 4,852 ft.

MARTIN COUNTY

Wright & Scott's No. 1 Flannigan, 330 ft. N and E, Sec. 22, Blk. 37, Twp. 1s, T.&P. Sur.
S.D. 100 ft. for csg.

MITCHELL COUNTY

Sawtell & Grueber's No. 1 Morrison.
S.D. 1,020 ft.

McCULLOCH COUNTY

Honea et al's No. 1 Cox, 450 ft. from S and 150 ft. from E, David Pope Sur.
S.D. 846 ft.

Geo. Poulter's No. 1 Dutton, 350 ft. from S and 450 ft. from E, Sec. 190, 2½ miles S of Poulter's gas well.
Drlg. 613 ft.

Skaggs & Brewer's No. 1 Dunn, 190 ft. from S and 570 ft. from E, Sec. 951, T. L. Hartig Sur.
S.D. 883 ft. (corrected).

PECOS COUNTY

Adams et al's No. 2 Masterson, 1,630 ft. from SE and 330 ft. from SW, Sec. 104, Blk. 10, H.&G.N. Sur.
Spudded and shut down.

Cardinal Oil Co.'s No. 1 White & Baker, 150 ft. S and E lines of "E" lease, Sec. 40, Blk. 194, G.C.&S.F. Sur.
Location.

Gulf Prod. Co.'s No. 6 White & Baker, 330 ft. from N and W, Sec. 94, Blk. 194.
Location.

C. R. Richards' No. 4 Courtney, 920 ft. from N and W, Sec. 78, Blk. OW, 360 ft. S of No. 2.
Rotary tools.

Samwan Oil Co.'s No. 2 Masterson, 330 ft. from W and 990 ft. from S lines of Sec. 104, Blk. 10, H.&G.N. Sur.
Rigged up machine.

Trans-Tex. Oil Co.'s No. 1 Caldwell, 330 ft.

from E line and 330 ft. from S line of Sec. 27, Blk. 40, Twp. 9, T.&P. Sur.
Drlg. 2,080 ft.

REAGAN COUNTY

Byrd-Frost Inc.'s No. 1 Boyd, 1,320 ft. from S and E of Sec. 6, Blk. E, L.V.S.&V. Sur.
S.D. 2,907 ft.

Dobbs No. 1 Friend, 2,310 ft. from S and 660 ft. from W of Blk. 3, Wm. Allen Sur., 3 or 4 miles S of Big Lake.
Drlg. 2,300 ft.

John Emch's No. 1 E. V. Belcher, 467 ft. from N and 1,400 ft. from E, Sec. 4, Blk. 4½, G.C.&S.F. Sur.
Rigged up machine.

Skelly Oil Co.'s No. 1-D H. S. Grayson, 1,980 ft. from N line and 660 ft. from W line of Sec. 33, Blk. 3, University Land Sur.
S.D. 9,967 ft.; bridged back to 3,100 ft.; shot csg. with perforation gun.

REEVES COUNTY

J. E. Cunningham's No. 1 Altman, 2,810 ft. from N line and 1,980 ft. from E line of Sec. 1, C. C. Wyatt Sur.
Top Delaware sand (by driller) 3,815 ft.; T.D. 4,090 ft.; to plug.

Herbert Oil Co.'s No. 1 Williams & Walker, 5,280 ft. from S and 1,320 ft. from E, Sec. 17, Blk. 6, H.&G.N. Sur.
Drlg. 1,400 ft.

K. Slack et al's No. 1 Reeves, C NW ¼ Sec. 20, Blk. 56, P.S.L. Sur., 22 mi. N of Toyah.
Spudded and shut down.

RUNNELS COUNTY

Dennis et al's No. 1 Wash, 550 ft. from N and 560 ft. from E of W half, Sec. 123, E.T.R.R. Sur.
Spudded and S.D.

Melrose Oil Co.'s No. 1 L. P. Woods, 150 ft. from NE lines and 3,475 ft. from W line of survey, Willett Holmes Sur. No. 100.
S.D. 2,507 ft.

R. Wells' No. 1 James, 396 ft. from N and 330 ft. from E of James tract in Sec. 16. D. Diaz Sur.
S.D. 1,100 ft.

SCHLEICHER COUNTY

John M. Cooper et al's No. 1 Bert Page, 1,290 ft. from N line, 1,470 ft. from W line of Sec. 40, Blk. L, G.H.&S.A. Sur.
S.D. 6,052 ft.

W. C. Proctor et al's No. 1 Judkins & Spencer, C SW¼ Sec. 4, Blk. V.28.
T.D. 212 ft.; skidded derrick.

SCURRY COUNTY

M. L. Goos et al's No. 1 J. E. Murphy, 330 ft. from N and 1,650 ft. from E, Sec. 114, Blk. 97, H.&T.C. Sur.
Drlg. 800 ft.

Magnolia Pet. Co.'s No. 1 J. W. Mooar, 1,630 ft. from N and 990 ft. from E, Sec. 342, Blk. 97, H.&T.C. Sur.
Location.

McLaughlin's No. 1 Allen, 1,331 ft. from N and 1,338 ft. from E, Sec. 298, Blk. 97.
S.D. 1,990 ft.

STONEWALL COUNTY

Barnsdall Oil Co.'s No. 1 S. Young, 350 ft. from N and E, Sec. 26, Austin & Williams Sur. 349.
Drlg. 514 ft.

Merry Bros. and Perrini et al's No. 1 Williams, C SW of SW Sec. 6, Blk. C, A.B. &M. Sur.
S.D. 3,330 ft.

SUTTON COUNTY

Texas et al's No. 1 Mower, 1,980 ft. from S and W of Sec. 39, Blk. 5, T.W.&N.G. Sur.
Top White lime 4,527 ft.; S.D. 4,750 ft.

Paul C. Texas' No. 1 G. S. Allison, 660 ft. from S and W, Sec. 49, Blk. A, G.W.T.&P. Sur.
Location.

TAYLOR COUNTY

Eastland Oil Co.'s No. 1 Tittle, 660 ft. from N and W, Sec. 37, Blk. 19, T.&P. Sur., 1 mile NE of Trent.
Machine.

TOM GREEN COUNTY

Jacobs et al's No. 2 DeLong, 150 ft. from N and 450 ft. from E, James Webb Sur. No. 83.
Drlg. 203 ft.

UPTON COUNTY

Baldridge Oil Co.'s No. 1 S. Peck, 440 ft. from S and E, Sec. 29, Blk. 41, Twp. 4s. T.&P. Sur.
Elev. 2,890 ft.; S.D. 3,702 ft.

T.P. Coal & Oil Co.'s No. 1 Cordova Union Land, 2,406 ft. from E and 330 ft. from N, Sec. 33, Blk. 1.
Drlg. 560 ft.

Gulf Prod. Co.'s No. 103 McElroy, 1,980 ft. from S and 660 ft. from W, Sec. 197, Blk. F, C.C.S.D.&R.G.N.G. Sur.
Drlg. 12,700 ft.

Humble Oil & Ref. Co.'s No. 1 Pollock, C of NW, Sec. 4, Blk. M.
Fishing 4,943 ft.

King Mountain Pet. Co.'s No. 1 Sherk, 330 ft. from S and W, Sec. 29, Blk. 1, M.K.&T. Sur.
S.D. 2,500 ft.

Williams & Williams Drlg. Co.'s No. 1 Robbins, 1,600 ft. from S and 1,900 ft. from E, Sec. 4, G.C.&S.F. Sur.
S.D. 2,040 ft.

WARD COUNTY

Atlantic O. P. Co.'s No. 2 Miller, 504 ft. from NE and 330 ft. from SE, W. F. Russell No. 3 Sur.
Drlg. 2,468 ft.

Alexander's No. 1 Richter, 1,650 ft. from NW, 1,170 ft. from NE line of Sec. 27, Blk. 34, H.&T.C. Sur.
Drlg. 2,282 ft.

Bradford et al's No. 1 E. R. Allen, 660 ft. from NW line and 551 ft. from NE line, Sec. 11, Blk. 5, H.&T.C. Sur.
T.D. 1,520 ft.; shut down.

Caprito's No. 1 Hardage & Wilson, 2,310 ft. from NE and 990 ft. from SE, Sec. 11, Blk. 34, H.&T.C. Sur.
Material.

Eastland Oil Co.'s No. 1 C. D. Mason, 330 ft. from SW and SE, Sec. 14, Blk. 34.
Cellar.

Gulf Prod. Co.'s No. 58 O'Brien, 330 ft. from E and 1,650 ft. from S, Sec. 18, Blk. F.
Rig.

Gulf Prod. Co.'s No. 56 O'Brien, 2,310 ft. from N and 330 ft. from E, Sec. 18, Blk. F.
T.D. 2,785 ft.; running tubing.

Gulf Prod. Co.'s No. 57 O'Brien, 2,310 ft. from S and 330 ft. from E, Sec. 18, Blk. F.
T.D. 1,515 ft.; testing water shut off.

Magnolia Pet. Co.'s No. 2 Sealy Estate, 2,310 ft. from S and 330 ft. from W, Sec. 43, Blk. F.
T.D. 1,960 ft.; set csg.

Rector Oil Co.'s No. 1 Monroe, 660 ft. from SE and NE, Sec. 2, Blk. 1, W.&N.W. Sur.
Top black lime 4,605 ft.; drlg. 4,610 ft.

Sageland Oil Corp.'s No. 2 Pure-Bennett, 1,650 ft. from NW and 2,310 ft. from SW S.D. 220 ft.

Jerry Sines' No. 1 Brown, 330 ft. from NW and NE, Sec. 13, Blk. 5, H.&T.C. Sur.
S.D. 3,126 ft.

West Texas O. & R. Co.'s No. 1-C University, 330 ft. from N and E, Sec. 6, Blk. 16.
S.D. 2,477 ft.

WINKLER COUNTY

Barnsdall Oil Co.'s No. 1 Brown & Altman, 2,310 ft. from S and E, Sec. 6, Blk. B-5, Elev. 2,844 ft.; drlg. 905 ft.

Emperor Oil Co.'s No. 1 Holley, 1,650 ft. from S and 330 ft. from E, Sec. 12, Blk. B-12.
Standard tools.

Green Prod. Co.'s No. 1 J. F. Cross, 330 ft. from N and 2,310 ft. from W, Sec. 4, Blk. B-10, P.S.L. Sur.
Shut down.

Gulf Prod. Co.'s No. 1 Keystone Cattle Co., NE of NW, Sec. 10, Blk. B-3, P.S.L. Sur.
Rigged up standard tools.

Gulf Prod. Co.'s No. 2 Keystone Cattle Co., NW cor. Sec. 17, Blk. B-2.
Rigged up standard tools.

Harry Adams' No. 2 Scarborough, 990 ft. from N line and 990 ft. from W line, Sec. 2, Blk. 77, P.S.L. Sur.
Location.

Humble Oil & Ref. Co.'s No. 2-A Walton, 660 ft. from S and W, Sec. 48, Blk. 26. Derrick.

Maxwell & Atlantic's No. 2 Daugherty, 990 ft. from S and 330 ft. from E, Sec. 11, Blk. 26, P.S.L. Sur.
Drlg. 2,920 ft.

J. C. Maxwell's No. 1 Brown & Altman, 2,310 ft. from N and 990 ft. from W, Sec. 6, Blk. B-5.
Elev. 2,844 ft.; drlg. 1,012 ft.

Mid-Continent Pet. Corp.'s No. 2 Howe, 1,650 ft. from N and 330 ft. from W, Sec. 12, Blk. 26.
T.D. 2,989 ft.; T.P. 2,800 ft.; C.O.

Richardson's No. 1 Walton, 1,010 ft. from S and 330 ft. from W, Sec. 1, Blk. B-3.
Drlg. 2,841 ft.

Skelly Oil Co.'s No. 2 Halley, 1,320 ft. from N and 2,200 ft. from E, Sec. 25, Blk. B-11, P.S.L. Sur.
S.D. 3,090 ft.

Sinclair Oil Co.'s No. 1 Lowett, 330 ft. from N and E, Sec. 36, Blk. 26, P.S.L. Sur.
T.D. 2,595 ft.; fishing.

Sun Oil Co.'s No. 1 Halley, 2,200 ft. from N and 440 ft. from E, Sec. 24, Blk. B-12, P.S.L. Sur.
Drlg. 2,755 ft.; making oil.

Texas Pacific Coal & Oil Co.'s No. 2 Daugherty, 1,650 ft. from S and 330 ft. from E, Sec. 2, Blk. 26, P.S.L. Survey.
Drlg. 2,810 ft.

YOAKUM COUNTY

C. J. Davidson et al's No. 1 Bennett, 1,320 ft. from N and E, Sec. 678, John H. Gibson Sur.
Drlg. water well.

Texas Panhandle Wildcats

Week Ending May 11

CARSON COUNTY

Johnson et al's No. 1 Eller, 330 ft. from N and E, Sec. 200, Blk. 3, I.&G.N. Sur.
Material.

Phillips Pet. Co.'s No. 2 Cooper, 327 ft. from N and 989 ft. from W lines of S½ of SE¼ of Sec. 4, Blk. 9, I.&G.N. Sur.
Drlg. 2,760 ft.

Robert Watchorn's No. 1 Eller, 330 ft. from S and E lines of W½ and SE¼ of Sec. 9, Blk. 7, H.&G.N. Sur.
T.D. 2,783 ft.; drlg. by drill pipe.

Texoma Nat. Gas Co.'s No. 1 Crutchfield, 1,335 ft. S and 1,328 ft. W, Sec. 37, Blk. 4, H.&G.N. Sur.
Location.

CHILDRESS COUNTY

Watchorn O. & G. Co.'s No. 1 Low, C NW SE¼ Sec. 417, W.&N.W. Sur., S of Kirkland.
Drlg. 5,348 ft.

COLLINGSWORTH COUNTY

T. Hunter et al's No. 1 Hill.
Rigged up.

T. Hunter et al's No. 1 Hill, 330 ft. S and 180 ft. E, Sec. 19, Blk. 17, H.&G.N. Sur.
Drlg. 612 ft.

Smith Bros.' No. 1 Pierce, C NE¼ Sec. 107, Blk. 21, H.&G.N. Sur.
Material.

COTTLE COUNTY

Texas Co.'s No. 8 Johnson, 500 ft. N and 318 ft. W of most northerly cor. of J. A. Smith Sur.
Rig.

DALLAM COUNTY

Eben Warner's No. 1 Jarboe, 1,520 ft. from S line, 415 ft. from W line, Sec. 2, B.&B. Sur.
S.D. 3,200 ft.

GRAY COUNTY

Bell O. & G. Co.'s No. 1 Furneaux, 434 ft. from S and E lines of SE¼ of Sec. 110, Blk. B-2, H.&G.N. Sur.
T.D. 2,375 ft.; standardizing.

Champlin O. & R. Co.'s No. 1 Taylor, 330 ft. from S and W of Sec. 6, Blk. 2, H.& G.N. Sur.
Drlg. 2,939 ft.

Continental Oil Co.'s No. 1 C. Wright, 990 ft. N and W, Sec. 13, Blk. 3, I.&G.N. Sur.
Derrick.

Drilling Exploration Co.'s No. 1 Lapold, 330 ft. S and W, Sec. 141, Blk. 3, I.&G.N. Sur.
Material.

Tom Doswell's No. 1 Herndon, 330 ft. from S and W lines of SE¼ of SW¼ of Sec. 166, Blk. 3, I.&G.N. Sur.
Rig.

Farliss et al's No. 1 Ball, 330 ft. from S and E lines of NW¼ of Sec. 6, Blk. 3, B.B. Sur.
S.D. 655 ft.

Harry Foster's No. 1 Johnson, 330 ft. from N and E lines of Sec. 21, L. L. Erwin Sur.
Spudded and S.D.

Warner's No. 1 Taylor, 330 ft. N and W of SE¼ Sec. 8, Blk. 8, A. W. Wallace Sur.
Drlg. 2,949 ft.

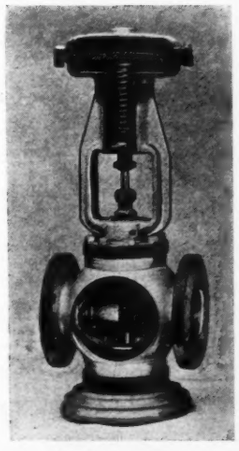
Irish-American Oil Co.'s No. 1-B Morse, 990 ft. S and 330 ft. E, W½ NE Sec. 54, Blk. 25, H.&G.N. Sur.
T.D. 2,780 ft.; swabbing.

Jeffries' No. 1 Sailor, 330 ft. from N and E of E½ of NW¼ Sec. 81, Blk. 3, I.&G.N. Sur.
T.D. 2,505 ft.; C.O.

McLaughlin et al's No. 1 Baggerman, 330 ft. from S and E of NW¼ Sec. 64, Blk. 3, I.&G.N. Sur.
Rig.

Phillips Pet. Co.'s No. 1 Saunders, 330 ft. from S and 345 ft. from W lines of S½ of NE¼ of Sec. 3, Blk. 1, B.S.&F. Sur.
Drlg. 2,735 ft.

Plains Holding Co.'s No. 1 Morse-Gulf, 330 ft. S and W, Sec. 57, Blk. 25, H.&G.N. Sur.
Material.



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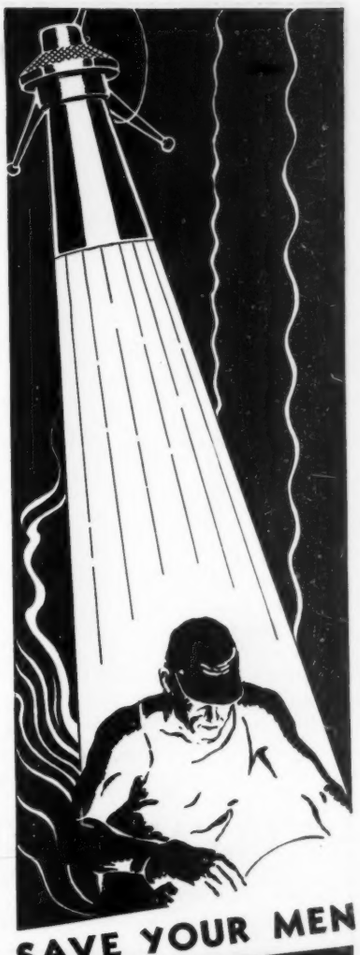

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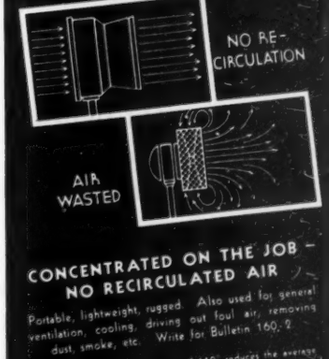

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Texas Co.'s No. 2-C Taylor, 330 ft. from N and E of E½ Sec. 52, Blk. B-2, H.&G.N. Sur.
Drlg. 3,232 ft.
Vulcan Oil Corp.'s No. 1-A Kinnard, 1,180 ft. from N and 150 ft. from W lines of E½ of SW¼ of Sec. 41, Blk. 35, H.&G.N. Sur.
T.D. 2,236 ft.; set csg.

HUTCHINSON COUNTY

Barnsdall Oil Co.'s No. 1 Lewis, 330 ft. N and E of W½ of E½, Sec. 7, Blk. 23, B.S.&F. Sur.
Moving in material.
Gulf Prod. Co.'s No. 1 Pitcher, 330 ft. N and W, Sec. 19, Blk. M-21, T.C. Sur.
Rig.
Huey et al's No. 1 Christian, 220 ft. from S and 330 ft. from W, Sec. 32, Blk. Y, A.&B. Sur.
T.D. 3,175 ft.; P.B. to 2,996 ft.; est. 6,000,000 to 8,000,000 ft. of gas.
Owl Oil Co.'s No. 1 Moore, 275 ft. S and W of NW 30 acres of NW¼, Sec. 21, Blk. M-21, T.C. Sur.
Rig on ground.
Phillips Pet. Co.'s No. 1 Daniel Dial, 330 ft. from S and 325 ft. from E lines of Sec. 36, Blk. M-23, T.C.R.R. Sur.
Location.
Power Pet. Co.'s No. 1 Hodges, 660 ft. S and E of most southerly 80 acres of S 160 acres of SE 200 acres, Sec. 16, Blk. M-35, T.C. Sur.
Rig.
Stinnett Oil Co.'s No. 1 Starnes, 330 ft. from N and 275 ft. from W of E¼ of NW¼ Sec. 22, Blk. M-23, T.C. Ry Sur.
S.D. 570 ft.; skidded rig 50 ft. north.
Texas Plains Oil Co.'s No. 1 State, 2,500 ft. SW of SW cor. of Sec. 15, Blk. 47, H.&T. C. Sur., and 330 ft. from N bank of Canadian River.
Material.
Texilvania Oil Co.'s No. 1 Thompson, 440 ft. N and 2,735 ft. E, Sec. 15, Blk. M-23, T.C. Sur.
T.D. 3,027 ft.; P.B.

MOORE COUNTY

Alma Oil Co.'s No. 1 Ward, 330 ft. N and W of SW¼, Sec. 63, Blk. 44, H.&T.C. Sur.
Derrick.
Sunray and Barnsdall Companies' No. 3 Jones, 330 ft. from N and W of E½ Sec. 164, Blk. 3-T, T.&N.O. Sur.
T.D. 3,636 ft.; P.B. to 3,619 ft.; estimated 40 bbls. oil per day.
Texas Interstate P. L. Co.'s No. 1 Brown, 330 ft. N and W of SE¼ Sec. 22, Blk. 44, H.&T.C. Sur.
Drlg. 2,700 ft.

OCHILTREE COUNTY

U. S. Oil Corp.'s No. 1 W. R. Norris, 330 ft. S and 990 ft. E, Sec. 212, Blk. 43, H. &T.C. Sur.
Rigged up.

RANDALL COUNTY

English et al's No. 1 Oxnard, 350 ft. from N and 1,320 ft. from E lines of NE¼ Sec. 85, Blk. 2, A.B.&M. Sur.
T.D. 5,636 ft.; may abnd.

WHEELER COUNTY

C. & H. Drlg. Co.'s No. 1 Binkley, 330 ft. from S and W lines of NE¼ of Sec. 25, Blk. 24, H.&G.N. Sur.
S.D. 2,195 ft.; gas at 1,853 ft. and 1,960 ft.
Johnson et al's No. 1 Pryor, 330 ft. N and E of E½ NE¼ Sec. 48, Blk. 13, H.&G.N. Sur.
Drlg. 2,125 ft.
Martin & Dubose's No. 1 Schwarting, 330 ft. from S and 990 ft. from W lines of SE¼ of Sec. 52, Blk. 13, H.&G.N. Sur.
Drlg. 1,346 ft.
Phillips Pet. Co.'s No. 1 Binkley, 330 ft. N and 990 ft. W of W½ of SW¼, Sec. 49, Blk. 24, H.&G.N. Sur.
Rig.
Smith Bros.' No. 1-B Harlan, 330 ft. from N and 990 ft. from W lines of W½ of SW¼ of Sec. 49, Blk. 24, H.&G.N. Sur.
T.P. 2,530 ft.; T.D. 2,540 ft.; testing.

Southwest Texas Wildcats

(Continued from Page 90)

GUADALUPE COUNTY

C. W. DeFreest's (Port Isabel O. & G. Co.) No. 1 Emil J. Leissner, 400 ft. from NW line, 150 ft. from SW line of 156-ac. tract, A. C. Davis Sur.
Abd. 1,810 ft.
Bob Gode et al's No. 1 Hicks, 1,320 ft. from E line, 150 ft. from S line of 189-ac. tract in Santo Y. Coy Sur.
Moving in material.
A. D. Locke's No. 1 Lowman, 210 ft. from SE and SW lines of 2,500-ac. tract in C. Campbell Sur.
T.D. 1,810 ft.; changing to rotary to whipstock 1,275 ft. to get post tools lost in hole.
Mineral Oil Corp. of Texas' No. 1 Allen Phillips, 162 ft. from N line, 900 ft. from E line of tract, Cortinos Sur.
Rigging up.
J. S. Suttle's No. 2 Baenziger, S of Seguin. Old well; R.U. to W.O.
Suttle et al's No. 1 Baenziger, 700 ft. from S line, 500 ft. from E line of 125-ac. tract, Monsola Sur.
C.O. 2,153 ft.; cleaned out to chalk; to run csg.
L. E. Trout's No. 1 McKee, 650 ft. from W line, 150 ft. from N line of tract, Green DeWitt Sur.
Coring 3,282 ft.

HIDALGO COUNTY

Downey & Morton's No. 1 Daskom, 450 ft. from E line, 55 ft. from S line of Blk. 34, Por. 45.
Cmtd. csg. 4,115 ft.; W.O.C.
E. H. East's No. 1 Carter, 330 ft. from E line, 900 ft. from N line of Blk. 19, East Retama Subd., Tule grant.
Drlg. 1,650 ft.
E. L. Smith's No. 1 Flores, 330 ft. from N line, 1,803 ft. from E line of Tract 250, Porcion 39.
Abd. 3,004 ft.

JIM HOGG COUNTY

French Oil Co.'s No. 2 T. T. East, 330 ft. from NE and NW lines, Blk. 74, Subd. No. 2 Las Moritas grant.
Rigging up.
Miller & Pippin's No. 1 Yeager, 527 ft. S line, 150 ft. E line of Blk. 6, Sur. 20.
Drlg. 3,385 ft.
A. Edmiston's (Southwestern Dev. Synd.) (formerly John D. Norwood) No. 1 C. W. Hallen, 330 ft. N and W lines, NW¼ NW¼ Sur. 48.
S.D. 1,600 ft.
Sun Oil Co.'s No. 1 T. T. East, 18,600 ft. from N line, 3,350 ft. from W line of Santa Domingo de Arribe grant.
Drlg. 3,120 ft.

JIM WELLS COUNTY

A. M. Hagan's No. 1 Robert Adams, SW cor. Sec. 10, M. Ruiz Sur.
Moving in rig.
Joe Lundin's No. 1 T. C. Hewitt, 330 ft. SE cor. Sec. 51, McKinney & Williams Sur.
Contract 4,504 ft.
Smith & Story's (Maer & Shira) No. 1 Schaefer, 1,320 ft. E of NW cor. center of Blk. 15, of subdivision of ranch.
Drlg. 1,870 ft.

KARNES COUNTY

H. A. Pagenkopg's No. 1 T. J. McAda, 330 ft. from NE and NW lines of Tract C, Martinez Sur.
Drlg. 5,200 ft.
R. G. Tonkin's No. 2 Henke, 1,650 ft. from S and E line of tract.
Digging pits.

KERR COUNTY

Meteor Oil Co.'s (Edminton & Walker) No. 1 Whitworth, 1,160 ft. from S line and 1,333 ft. from E line of Sec. 1,439, of the H.E.W.T. Sur.
S.D. 950 ft.
Jeff Love and Eastland Oil Co.'s No. 5-E Jeff Love, 1,500 ft. SE of No. 1 and 1,530 ft. from SE cor. and 300 ft. from N line of Sec. 1,591.
T.D. 5,450 ft.; bailed a little oil.

KLEBERG COUNTY

Parr & Ponder's No. 1 Sam Michalk et al, 5 miles SE Kingsville.
S.D. 1,050 ft.

LASALLE COUNTY

C. W. Benk's No. 1 Felix, 1,300 ft. from S line, 300 ft. from W line of Sur. 47.
S.D. 1,815 ft.
S. H. Killingsworth's No. 1 Yeager, 100 ft. from W line, 300 ft. from N line, Sec. 94, Blk. 5, Lot 10.
Abd. 2,001 ft.

LEE COUNTY

Jas. E. Pederson's No. 1 Turner, 1,860 ft. from N line, 150 ft. from E line of tract, David Hudson Sur.
T.D. 6,560 ft.; P.B. to 6,150 ft.; preparing to perforate csg.

LIVE OAK COUNTY

Orbit Drlg. Co.'s (Baugh & McMillan) No. 1 Walton & Campbell, 1,500 ft. NE line and SE line of D. R. Fant Sur.
3,630 ft.; no report.
Henderson Coquat's No. 1 Reagan, McGloin Sur., E of Nueces River and S of Oakville.
Set surface csg.
Henderson Coquat's (Luling O. & G. Co.) No. 1 Rex, 330 ft. from SE and SW lines of 629-ac. tract, C of SW¼ of G.H.&H. Sur., Abst. 197, 3 miles S of Mileska.
Drlg. 3,815 ft.
Lefevre, Spice & Feltner's No. 1 Carter Inv. Co. (Chappa ranch), 330 ft. from SW cor. NE¼ of Sec. 299, Hooper & Wade Sur.
Moving in material.
J. O. Whittington's No. 1 Little, 1,320 ft. NE of S cor. of M. M. Shipp Sur., 330 ft. N of S line.
T.D. 5,755 ft.; pulling tubing and preparing to swab.

McMULLEN COUNTY

Henderson Coquat's No. 1 Essell, midway N and S lines, 2,000 ft. from SE line, D. R. Fant Sur.
Drlg. 660 ft.
Inland Oil Co.'s No. 1 Lark, 150 ft. from N and W lines of 407-acre tract, Scrugham Sur.
Set csg. 973 ft.; drlg. plugs.
Brown & Nessly's No. 1 Dr. Worley, 9,930 ft. N of river along W line of O'Boyle Sur., 1,399 ft. E at R/A.
Drlg. below surface csg.
Chas. A. Hall's No. 1 B. C. Claunch, 368 ft. from N line, 160 ft. from E line of 25-ac. tract, Michael Haley Sur.
Location.
Howeth & Swiger's No. 1 Rhodes, near C 990 ft. from N and W lines of Sec. 22, M. F. Lowe Sur.
Drlg. 3,200 ft.
Texlo Oil Co.'s No. 1 Ellen Atkinson, 330 ft. from S and W lines of 80-ac. tract, Martha J. Deen Sur., Sec. 13.
Rigging up.

MEDINA COUNTY

Dupre & West's No. 1 Mott, 100 ft. from E line, 810 ft. from N line, J. Ball Sur. No. 1,473.
100 ft.; no report.
John Lind's No. 1 Jungman, 2,050 ft. from N line, 550 ft. from W line, J. Degat Sur.
1,790 ft.; no report.
W. T. Shoemaker's No. 1 Noonan, 52.5 ft. S 2 deg. 20 ft. E of old well, Sec. 349, M. Simon Sur.
T.D. 450 ft.; hole caving; to move in rotary.

NUECES COUNTY

Southern Minerals' No. 1-B Morgan, Roberts Sur.
Drlg. 1,075 ft.

REAL COUNTY

H. J. Heartwell et al's No. 2 L. J. Maby, 250 varas from NW line, 775 varas from SW line of A.B.&M. Sur. No. 175.
Drlg. gas sand 2,050 ft.; no report.

SAN PATRICIO COUNTY

Masterson et al's (Tom Graham) No. 1

Wurzbach, 330 ft. from W line, 4,350 ft. from S line of C. C. Hornsby Sur.
Standing 5,521 ft.

STARR COUNTY

Armstrong, Emmanuel & Adams' No. 1 S.C. C.C., 330 ft. from S and E lines of Blk. 57, Porcion 88-89.
Ready to gun perforate 2,740 ft.

C. R. Borah's No. 1 A. Guerra, San Jose grant, 330 ft. from N and 150 ft. from E lines of Sec. 6 (NE part of county).
3,035 ft.; no report.

John H. Clopton's No. 1 Mrs. A. M. Kelsey-Bass, 2,950 ft. from W line, 3,610 ft. from E line of Porcion 88 in Porcion 86, Jurisdiction of Camargo.
Moving in material.

John H. Clopton's No. 1 Dioncia Lopez de Tijerina, Blk. 4, Tract C-14, Porcion 80.
T.D. 1,750 ft.; moved in new rig to resume drlg.

Crawford et al's No. 1 Hicks et al, 187 ft. from NW line, 318 ft. from NE line of Blk. 6, Pedernal grant.
S.D. 1,615 ft.

Heep Oil Co.'s No. 1-A Guerra, Blk. 35, 30 ft. S from No. 1, Porcion 55.
2,700 ft.; no report.

Hiram Reed's No. 1 Block Bros., Tract A-28, Porcion 80, Blk. 4.
1,500 ft.; no report.

Dale Sneed's No. 1 Y. and V. Guerra, 330 ft. W line of Por. 68, 330 ft. S line of 1,000-ac. block of N end of Por. 92, in Por. 68.
Standing 330 ft.

Sunray Oil Co.'s No. 1 Lopez (Munoz), 2,600 ft. from N line, 880 ft. from E line, Porcion 75.
Drlg. 3,850 ft.

Sun Oil Co. and Humble's No. 1 Mantor & Briggs, 660 ft. from NE line, 657 ft. from NW line of A.B.&M. Sur., NW¼ of NW¼ of Sur. 53.
Drlg. 205 ft.

WEBB COUNTY

Payne et al's No. 1 Hoggterp, 450 ft. from SE line, 300 ft. from NE line, Blk. 5, Sur. 1,110, W of Oilton.
Coring 1,919 ft.; odor of oil at 1,900-19 ft.

Arthur H. Wray's No. 1 Geo. Stuempke, Share 1, Brewster pasture, Galan grant.
Drlg. 1,008 ft.

WILLACY COUNTY

W. T. Daniel's No. 2 Armendiaz, near Rio Hondo, 7,798 ft. from E and W lines of Share 14.
Drlg. 4,050 ft.

Kingwood Oil Co.'s No. 1 Santa Rosa, Inc., 160 ft. from E line, 637 ft. from S line of Sec. 30, Blk. 16, Share 44, San Juan de Carricitas grant.
S.D. 1,495 ft.

WILLIAMSON COUNTY

Hays et al's No. 1 Pfluger, 150 ft. from E line, 150 ft. from S line, White Sur.
S.D. 915 ft.

ZAPATA COUNTY

F. H. Crow et al's No. 1 Daniel Yzaguirre, 330 ft. out of SW cor. Share 1, Porcion 14-15-16, D. Yzaguirre tract.
Drlg. 600 ft.

Danvers & Harrison's No. 1 D. A. McAskill, 660 ft. SE and SW lines, Blk. 51, Edwards Subd., Borrego grant.
Set and cmtd. csg. 20 ft.

Texas Royalty Investment Co.'s No. 1 N. J. Vela, 686 ft. from NE line, 300 ft. from NW line, Blk. 7, Por. 29.
Coring 2,332 ft.

Southwest Texas Proven

Week Ending May 11

CAESAR—BEE COUNTY

Caesar Oil Co.'s No. 3 R. E. Miller, 1,900 ft. from W line, 330 ft. from S line of F. Lewis Sur.
Had gas blowout at 1,100 ft.; no report.

Caesar Oil Co.'s No. 5 R. E. Miller, 150 ft. from S and E lines of lease, F. Lewis Sur.
T.D. 3,010 ft.; comp.; making gas and oil.

McAllister Fuel Co.'s No. 1 W. J. Vaughn, 150 ft. from S and W lines of 53.7 acres, Franklin Lewis Sur.
T.D. 3,045 ft.; comp. average well.

El Toro Oil Co.'s No. 1 J. J. Grisson, 150 ft. from N and W lines of 10-ac. tract, P. B. Early Sur.
Spudded.

Tothen Oil Co.'s No. 1 Hudman, 150 ft. from N and E lines of lease in Chas. Baker Sur.
T.D. 3,117 ft.; abd.

DIRKS—BEE COUNTY

Dirks Bros.' (Conservative Oil Co.) No. 1 Harris, 330 ft. S of N line, 330 ft. W of E line of 30-ac. tract, J. L. Dugat Sur.
Derrick.

Dirks Bros. and Wrightsman's No. 2 Roth, 662.8 ft. N of No. 1, 330 ft. from N and W lines of N½ of SW¼ of Sec. 7, J. M. Uranga grant.
T.D. 3,850 ft.; I.P. 16 bbls. per hour, 7/32-in. choke; 360 lbs. T.P.; 240 lbs. C.P.

Home Oil Co. 's (Wrightsman) No. 1 C. W. Bassinger, 330 ft. from N and E lines of NW¼ of Sec. 7, J. M. Uranga grant.
Drlg. 2,340 ft.

Mills Bennett Prod. Co.'s No. 2 (A-1) Bassinger, 330 ft. out of SW cor. of N 43-ac. tract, Sec. 7.
Drlg. plugs 3,340 ft.

Mills Bennett Prod. Co.'s No. 1-B C. W. Bassinger, 256 ft. from W line, 330 ft. from S line of SE¼ of NW¼ of Sec. 7, Ragley Subd., Uranga grant.
Derrick.

RAY POOL—BEE COUNTY

Leslie McKay, trustee's No. 1 Phil L. Campbell, 700 ft. from N line, 150 ft. from E line of W. B. Blanchard Sur.
T.D. 3,934 ft.; I.P. 8 bbls. per hour, 3/16-in. choke.

TULETA—BEE COUNTY

Edwin M. Jones' No. 3 Rapp, 660 ft. due N of No. 7 Robinson, Sec. 5.
T.D. 3,933 ft.; I.P. 190 bbls. per day, ¼-in. choke.

Edwin M. Jones' No. 1 Unsicker, 330 ft. from S and E lines of Sec. 6.
T.D. 4,276 ft.; P.B. to 3,950 ft.; W.O.C.

Heyser Heard & Walton's No. 2 Perez, C of Blk. 16, of SW¼ of Sec. 8.
Abd. 4,060 ft.

Southwest Exploration Co.'s No. 1 Heyden & Bruckhan, C of farm tract, 330 ft. from N and W lines of Sec. 20, Uranga grant.
Rigging up.

Stanolind O. & G. Co.'s No. 1 Walton, 330 ft. from W line, 6,111 ft. from N line, Blk. 21, Ragley Subd., J. M. Uranga grant.
Drlg. 3,000 ft.

Wrightsman Oil Co.'s No. 1 Kimball, 1,200 ft. from NW line, 1,500 ft. from NE line, S. Winship Sur.
Standing 1,800 ft.

VON ORMY—BEXAR COUNTY

N. G. Carter's No. 1 F. Bilhartz, 150 ft. from N and E lines of lease, F. Rolen Sur. No. 48.
Drlg. 750 ft.

GOVERNMENT WELLS POOL—DUVAL COUNTY

Bridwell Oil Co.'s No. 2 J. D. Southerland, 660 ft. due N of No. 1, 330 ft. from E line of Sec. 122, H.E.&W.T. Sur.
Trying to comp. in sand 2,701-18 ft.

Central Producers' No. 4 Wendt, 990 ft. from E line, 330 ft. from N line, Sur. 43.
Rigging up.

Govt. Wells Oil Corp.'s No. 17 State, 330 ft. from S and E lines of NW¼ of NE¼ of Sur. 48.
T.D. 2,292 ft.; I.P. 65 bbls. per day.

Magnolia Pet. Co.'s No. 8-C Hahl, 330 ft. from N line, 660 ft. W of No. 7, Sec. 61, J. Poitevent Sur.
T.D. 2,339 ft.; I.P. 60 bbls. per day

Magnolia Pet. Co.'s No. 8 M. Ruiz, 1,036 ft. from SE line, 330 ft. from SW line of Sur. 574.
TD. 2,441 ft.; I.P. 65 bbls. per day on pump.

Magnolia Pet. Co.'s No. 42 D.C.R.C., 600 ft. N of No. 34, 2,312.7 ft. from N line, 330 ft. from E line, Sec. 208, J. Poitevent Sur.
T.D. 2,324 ft.; I.P. 10 bbls. per hour.

Magnolia Pet. Co.'s No. 7 J. T. Johnson, 330 ft. from S line, 660 ft. SE of No. 5, Sec. 44, J. Poitevent Sur.
Drlg. 2,010 ft.

Parr Oil Corp.'s No. 1 R. E. Glover, 330 ft. from S and W lines of SE¼ of SE¼ of Sec. 44, J. Poitevent Sur.
Testing sand 2,350 ft.

Parr Oil Co.'s No. 2 R. E. Glover, 330 ft. from N and W lines of SE¼ of SE¼ of Sec. 44, J. Poitevent Sur.
Location.

Parr Oil Corp.'s No. 3 R. E. Glover, 330 ft. from N and E lines of SE¼ of SE¼ of Sec. 44, J. Poitevent Sur.
Location.

Reynosa Oil Co.'s No. 9-C D.C.R.C., 200 ft. from E line, 400 ft. from N line of SE¼ of Sur. 363.
T.D. 2,270 ft.; I.P. 100 bbls. per day.

Sun Oil Co.'s No. 7 Cuellar Motor Co., 701 ft. E of No. 3, 330 ft. from S line of Sec. 576, B.S.&F. Sur.
T.D. 2,431 ft.; I.P. 65 bbls. per day

Sun Oil Co.'s No. 8 Cuellar Motor Co., 701 ft. E of No. 7, 330 ft. from S line of Sec. 576, B.S.&F. Sur.
Rigging up.

Texas Co.'s No. 8 B.D.C.C., 330 ft. from W line, 990 ft. from S line, Sur. 135.
T.D. 2,339 ft.; I.P. 100 bbls. per day.

SARNOSA—DUVAL COUNTY

Magnolia Pet. Co.'s No. 9 M. Ruiz, 701 ft. N of No. 8, 330 ft. from W line, Sec. 574, B.S.&F. Sur.
W.O.C. 2,415 ft.

HOFFMAN—DUVAL COUNTY

Conway & Butscher's No. 2 Hoffman, 330 ft. S, 325 ft. E of SW cor. of Sur. 120 in Sur. No. 114
S.D. 3,014 ft.

LOMA NOVA—DUVAL COUNTY

Al Buchanan and Blanco Oil Co.'s No. 3 J. O. Trevino (Ruiz), 660 ft. due N of No. 1, 330 ft. from E line, Sec. 73, J. Poitevent Sur.
T.D. 2,693 ft.; completing

Al Buchanan and Blanco's No. 4 Ruiz, 660 ft. W of No. 2.
Rigging up.

Hamill-Smith et al's No. 1 M. C. Hubbard, 330 ft. out of SW cor. of S half of W half of Sec. 77, Morris & Cummings Sur.
Drlg. below surface csg.

Humble O. & R. Co.'s No. 4 G. Ruiz Est., 330 ft. from W line, 1,497 ft. from S line, Sec. 553, B.S.&F. Sur.
Reaming to make test, 2,775 ft.

Humble O. & R. Co.'s No. 1-C Jas. F. Welder, 330 ft. from S and W lines of Sec. 73, Stone, Kyle & Kyle Sur.
1,050 ft.; no report.

Texas Co.'s No. 3 M. Vela, 810 ft. from S line, 330 ft. from E line of S half of Sur. No. 42.
Derrick.

NORTH KOHLER—DUVAL COUNTY

G. G. Mortiner's No. 2-B Peters, 2,310 ft. from W line, 330 ft. from N line of SW¼ of Sur. 196.
Abd. 2,711 ft.

PEARSALL—FRIO COUNTY

Amerada Pet. Corp.'s No. 4 Oppenheimer, 3,200 ft. from NW line, 990 ft. from NE line, J. H. Gibson Sur.
Drlg. 1,600 ft.

Amerada Pet. Corp.'s No. 1 W. H. Smith et al, 4,500 ft. from NE line, 1,650 ft. from SE line, Joseph V. Mason Sur. No. 322.
Drlg. 1,485 ft.

DARST CREEK—GUADALUPE COUNTY

Grayburg Oil Co.'s No. 14 McKean, 700 ft. from No. 13, Cottle Sur.
Standing 1,854 ft.

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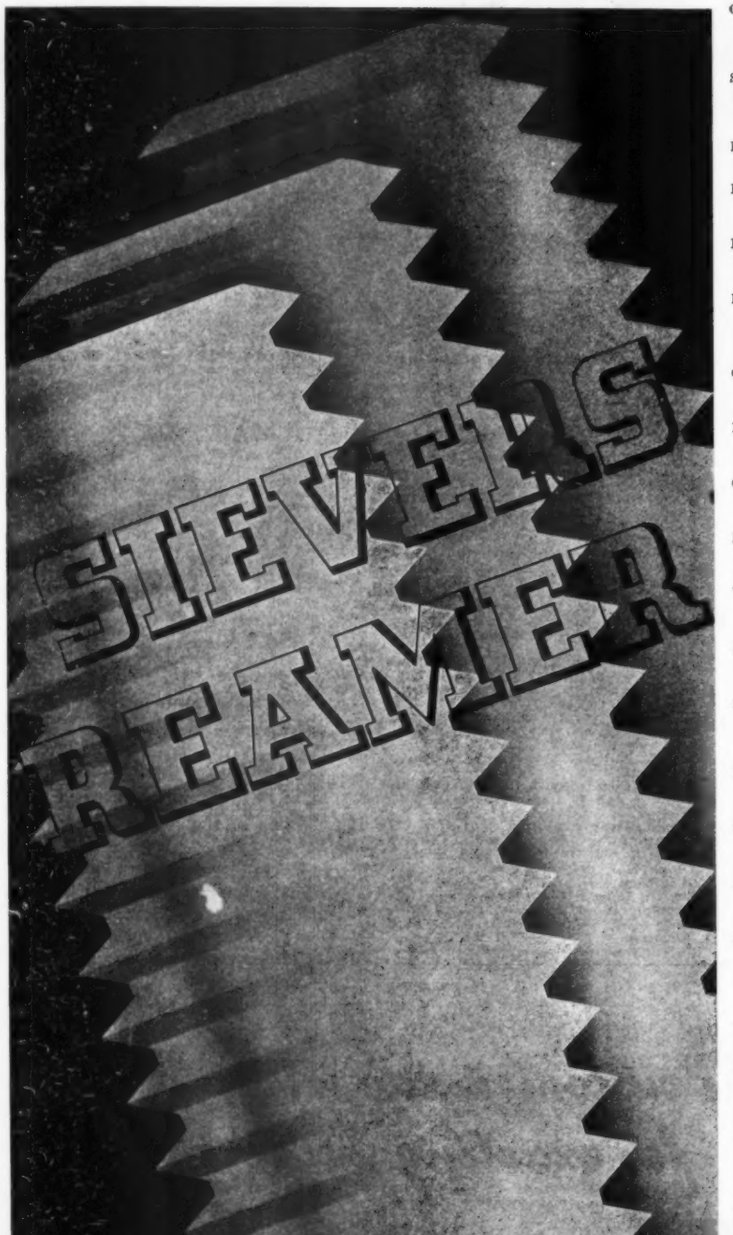
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Grayburg Oil Co.'s No. 15 McKean, 200 ft. from NE line, 150 ft. from SE line, H. Cottle Sur.
Spudded and S.D.

DINERO—LIVE OAK COUNTY

Smith & Story's No. 1 Nueces Townsite, Jane Curry Sur., NW offset to their No. 1 Fredericks.
Drlg. 4,450 ft.

LUCAS—LIVE OAK COUNTY

Houston Oil Co.'s No. 32 Cartwright, 1,124 ft. N of No. 31, Trudo Sur.
Drlg. sand and shale 5,404 ft.

Lion Oil Ref. Co.'s No. 5 P. E. McNeill, 330 ft. from NW line, 1,350 ft. from SE line of G.H.&H. Sur. in Jane Curry Sur., Blk. 9. Location.

Lion Oil Ref. Co.'s No. 7 McNeil, 600 ft. from SE line, 370 ft. N of No. 5, J. Curry Sur., Blk. 9.
Drlg. 4,100 ft.

Lion Oil Ref. Co.'s No. 6 McNeil, 670 ft. SE of No. 1, 760 ft. from SE line of S. N. Dobie Sur., Blk. 9.
Drlg. 3,600 ft.

SAM FORDYCE—HIDALGO COUNTY

Cortez Oil Co.'s No. 1-B Smith, 133 ft. from N line, 164 ft. from W line of S 99 acres of Tract B-3, Porcion 41.
T.D. 2,758 ft.; I.P. 6 bbls. per hour.

Barnett et al's (Roy Johnson) No. 1 Missouri Pacific Ry., S edge of right of way, 500 ft. from W line of Porcion 41.
T.D. 2,756 ft.; I.P. 60 bbls. per day

Cortez Oil Co.'s No. 1-C Smith, 230 ft. from N and W lines of NE 40 acres of Tract B-3, Porcion 41.
Rigging up.

E. A. Davis' No. 1 T. Flores, Tract 312, Porcion 38, 500 ft. SW of nearest production.
Moving in material.

W. F. Lacy's No. 1 V. R. deFlores, 75 ft. from N line, 107 ft. from E and W lines, Blk. 266, Porcion 38.
Drlg. 1,150 ft.

Jack Porter's No. 1 C. E. Smith, 150 ft. from N line, 165 ft. from E line of S½ of Tract 278, Porcion 40.
Cmtd. csg. 2,766 ft.; W.O.C.

Rogers Oil & Gas Co.'s No. 4 Guerra, SE 25-ac. tract, 500 ft. from N line, 494 ft. from W line, Tract 254, Por. 40, Share 6.
T.D. 2,761 ft.; comp.; no gauge; 3/32-in. choke, 200 lbs. pressure.

Rogers Oil & Gas Co.'s No. 3-B Guerra, 516 ft. from E line, 150 ft. from S line, Tract 254, Porcion 40.
Derrick.

Showers & Moncrief, Inc.'s No. 3 C. E. Smith, 230 ft. from N line, 164.2 ft. from E line of Share 3-B, Porcion 41.
Spudded.

Skelly Oil Co.'s No. 1-A Seabury, 198 ft. from E line, 230 ft. from S line of 12-ac. tract, Tract 256, Porcion 38.
Moving in material.

Smith & Dayvault's No. 1 Seabury, 100 ft. from N line, 150 ft. from E line of 22.90-ac. tract, Tract 256, Porcion 38.
T.D. 2,915 ft.; perforated at 2,844-56 ft.; tested oil and S.W.; P.B. to 2,790 ft.

SANDIA—JIM WELLS COUNTY

Magnolia Pet. Co.'s No. 6 Seeligson, 660 ft. W, 330 ft. S of No. 3, Canales Sur. No. 20.
Drlg. 4,570 ft.

O. W. Killam's No. 5 W. D. Wade ranch, 1,285 ft. from S line, 1,640 ft. from E line, 1,250 ft. SE of No. 4, in 1,000-ac. tract, Blk. D, Lopez de Jean grant.
Abd. 4,201 ft.

O. K. Killam's No. 6 Wade, 500 ft. S of No. 4.
Spudded.

BURNEL—KARNES COUNTY

American Liberty Oil Co.'s No. 1 C. H. Walfmuller, 330 ft. from SE and SW lines of 207-ac. tract, Jas. Johnson Sur.
T.D. 3,475 ft.; P.B. 3,290 ft.; W.O.C.

Luling O. & G. Co.'s No. 1 W. C. Boyce, 150 ft. from NW cor. of tract, J. Johnson Sur.
Coring 3,350 ft.

KINGSVILLE—KLEBERG COUNTY

Ray Clark's No. 1 House, Lot 5, Blk. 37, K.T.&I. Co. Sur.
S.D. 1,000 ft.

Fidelity Exploration Synd.'s No. 1 Vivian Kivlin, Sec. 4, Blk. 39, K.T.&I. Sur. on Vivian Kivlin lease.
Derrick up.

JACOB POOL—McMULLEN COUNTY

Loma Oil Co.'s No. 37-A Leonard Jacob Corp., 150 ft. from E line, 330 ft. due N of No. 23-A, W. H. Jacob Sur. No. 8.
Running csg. 960 ft.

Loma Oil Co.'s No. 2-W L. Jacob Corp., 220 ft. from E line, 1,320 ft. due N of No. 1-W, W. D. Benham Sur.
Rigging up.

SINTON—SAN PATRICIO COUNTY

Heep Oil Co.'s No. 1-E E. H. Welder, 455 ft. out of NE cor. of Sec. 46, Coleman Pasture.
Drlg. 5,130 ft.

Plymouth Oil Co.'s No. 2-C E. H. Welder, 2,000 ft. from N line, 680 ft. from E line, Sec. 49, Subd. No. 1 of Eliza H. Welder ranch.
Setting csg. 450 ft.

Plymouth Oil Co.'s No. 3-C E. H. Welder, 744 ft. from N line, 2,000 ft. from E line, Sec. 49, Subd. No. 1, E. H. Welder ranch.
Rigging up.

Plymouth Oil Co.'s No. 1-D E. H. Welder, 466 ft. from N line, 466 ft. SE of Ry., Sec. 1, Subd. No. 1, E. H. Welder ranch.
Rigging up.

LOS OLMOS—STARR COUNTY

H. L. Curry's No. 2 Bass, 660 ft. from S line, 1,835 ft. from E line of 640-ac. tract, Sec. 8, Porcions 75, 76 and 77.
Drlg. 1,250 ft.

Ed Linberg's No. 6 Bass, 1,350 ft. from W line, 150 ft. from N line of S½ of NW¼ of Share 6, Porcion 75-76-77.
S.D. 325 ft.

BARBACOAS—STARR COUNTY

R. G. Hall's No. 1 Doyno et al, 150 ft. from N line near center of Blk. C-31, Tract 21, Porcion 41.
Abd. 1,395 ft.

PLACETAS—STARR COUNTY

Hughston Oil Co., Inc.'s No. 1 Ben D. Wood, 701.6 ft. from S line, 162 ft. from W line of 1,000-ac. tract, Porcion 84.
Fishing 900 ft.

RIO GRANDE—STARR COUNTY

H. R. & R. Oil Co.'s No. 1 Goodrich, Porcion 81, 150 ft. from N and W lines, Blk. 5, Share 5.
Drlg. 250 ft.

Sioux Oil Corp.'s No. 8 Goodrich, 150 ft. from W line of Blk. 5, 150 ft. from N line of block.
Drlg. 1,175 ft.

SAXET—NUECES COUNTY

Benedum & Trees' No. 1 Stillwell, 330 ft. from W line, 629 ft. from N line, Blk. 31, 1,500 ft.; no report.

J. K. Cutton's No. 3 Sagarin, 330 ft. from S and E lines of tract, Form Lot No. 5, C.E.P.I.&M. Sur.
T.D. 4,882 ft.; I.P. 150 bbls. per day.

Houston Oil Co.'s No. 3 Morgan, 990 ft. from E line of lease, 330 ft. from N line of lease, Sec. 7, Range 5.
Location.

Magnolia Pet. Co.'s No. 2 W. W. Walton, 330 ft. from E line, 289 ft. from S line of 92.11-ac. tract, Enrique Villareal Sur.
Location.

Southern Minerals' No. 1-A Rand Morgan, Roberts Sur.
Drlg. 1,075 ft.

KIMBRO—TRAVIS COUNTY

J. M. Hickey's No. 1 Altick Lind. 150 ft. from S line, 820 ft. from E line of 41.05-ac. tract in McHenry Windburn Sur.
S.D. 1,194 ft.

BRUNI-WEBB COUNTY

Associated Oil Co.'s No. 3 A. M. Bruni, 660 ft. N of No. 2, 330 ft. from W line, 5,000-ac. tract, Blk. 7, M. Arispe grant.
Location.

Associated Oil Co.'s No. 4 A. M. Bruni, 330 ft. from NW line, 660 ft. SW of No. 2, Blk. 7, M. Arispe grant.
Coring 2,250 ft.

American Liberty Oil Co.'s No. 2-C A. M. Bruni Est., 266.81 ft. from E line, 408.15 from S line of Unit 2, Sec. 7, M. Arispe grant.
W.O.C. 3,407 ft.

Highland Oil Co.'s No. 8 Bruni, 1,650 ft. from NW line, 330 ft. from NE line, Sur. 7.
Set csg. 3,394 ft.; W.O.C.

Highland Oil Co.'s No. 10 A. M. Bruni, 949 ft. NE of No. 3, 506 ft. SE of No. 5, 202.4-ac. tract, M. Arispe grant.
Location.

Highland Oil Co.'s No. 12 A. M. Bruni Estate, 520 ft. E of No. 6, 330 ft. from S line of 200-ac. tract, M. Arispe grant.
Location.

O. W. Killam's No. 36 Bruni, 330 ft. from NE line, 760 ft. from SE line, Sur. No. 6.
Drlg. 1,550 ft.

Peerless & Seeligson's No. 3 Bruni, 330 ft. SE line, 250 ft. SW line, Sur. 6.
Drlg. plugs 3,412 ft.

Tide Water Oil Co.'s No. 4 Bruni, 1,650 ft. from SW line, 330 ft. from NW line of 500-ac. tract, Sur. 7.
Set surface csg.

LAUREL—WEBB COUNTY

South Texas Oil Co.'s No. 1 Laurel Bros., 100 ft. from E line, 200 ft. from S line of Sec. 269, Blk. 2, C.C.S.D.&R.G.N.G. Sur.
Location.

J. Elmer Thomas' No. 5 Gates, 990 ft. N and E lines, Sur. 22.
Abd. 3,001 ft.

J. Elmer Thomas' No. 8 Gates, 1,320 ft. from W line and N line of Sur. No. 59.
Drlg. 1,360 ft.

WEST COLE POOL—WEBB COUNTY

Ross Barnhart's No. 1 de la Garza, 1,500 ft. from N line, 200 ft. from E line of Sur. 262.
T.D. 2,406 ft.; fishing 1,600 ft.

Carolina Texas O. & G. Trust, Inc.'s No. 11 S. Benavides, 150 ft. from S line, 600 ft. from W line, Blk. 12, Sur. 683.
T.D. 4,993 ft.; making 1,750,000 ft. of gas, 750 lbs. pressure; still cleaning.

French Oil Corp.'s No. 2-B Benavides, 150 ft. S and W lines of SE¼ of SE¼ of Sur. 661.
T.D. 2,346 ft.; I.P. 100 bbls. per day.

Magnolia Pet. Co.'s No. 1 G. Benavides, Blk. 255, Hale Subd., Arispe grant.
T.D. 2,774 ft.; I.P. 10 bbls. per hour on ½-in choke.

Magnolia Pet. Co.'s No. 9 A. Benavides, 150 ft. from N line, 300 ft. E of No. 8, Sec. 660, S.K.&K. Sur.
Location.

NOACK—WILLIAMSON COUNTY

Coffield & Lanning's No. 3 Heap, 200 ft. from N line, 225 ft. from W line of tract in White Sur.
Location.

R. R. Ogden's No. 1 Matteck, 150 ft. N and W lines of 108.5-ac. tract in White Sur.
Location.

LOPENA—ZAPATA COUNTY

Allen & Morris' No. 1 Pena, 330 ft. out of SW cor. of 230-ac. tract, Share 19, Blk. 19.
Testing sand 2,445-53 ft.

JENNINGS—ZAPATA COUNTY

Texas Co.'s No. 67 Jennings, 800 ft. NW of No. 66, in 15,941-ac. tract, Cerrito Blanco grant.
T.D. 1,206 ft.; I.P. 10 bbls. per day on pump.

Texas Co.'s No. 68 Jennings, 800 ft. N and 250 ft. at R/A from No. 67.
Spudded.

MIRANDO VALLEY—ZAPATA COUNTY

C. L. Smith's No. 1 Robert Hinnant, 330 ft. out of NW cor. Sec. 307, Blk. 27, F. M. Makeig Sur.
Moving in material.

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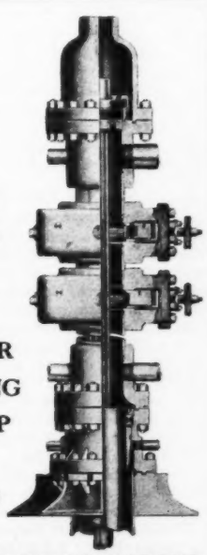

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Among Gulf Coast Drilling Contractors

Edwards Drilling Co. is moving in a rig for Hamil and Smith for a test in the Mykawa Field, Harris County. The same contractor has two other rigs running; one is on a wildcat test for Woodley Petroleum Co. in St. Landry Parish, Louisiana, and the other is running for the Mortex Corp. in the Conroe Field.

Smith and McDannald have spudded a test for Pure Oil Co. in Louise Field, Wharton County, and are moving in a rig on the Thompson "B" lease for the Tide Water Oil Co. in the East Texas Field. The same contractors are moving in for another test on the Mire lease for Superior Oil Producing Co. in the Bosco Field, Louisiana. No change has been made in the other rigs previously reported at Bosco and the Roanoke Fields.

San Patricio Drilling Co. has one rig running for E. J. Nichlos in the Tomball Field.

C. & C. Drilling Co. has four rigs running in the Livingston Field, Polk County. Screen has been set preparatory to testing No. 7 Davis and Holmes being drilled for the Gem Oil Co. Surface casing has been cemented on the same company's No. 2 Watt, and a rig is being moved in for No. 3 Watt. T. A. Carlton, president of the C. & C. Drilling Co., is preparing to move on the T. A. Carlton Oil Co.'s lease for his No. 2 Watt. Contract has been let to the company for Coast Petroleum Corp.'s No. 2 Maco Stewart, south of the Dickinson Field in Galveston County. The rig is ready to be moved to the location.

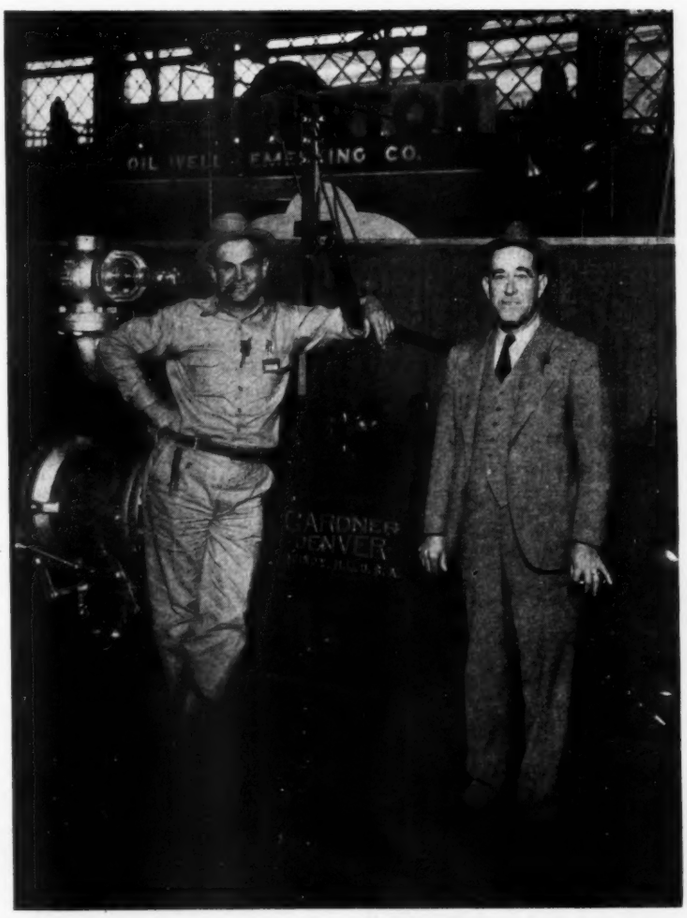
Cron and Gracey have nine rigs running; three are located at the Iowa Field for Shell Petroleum Corp., two for the same company at the Roanoke Field, one for Texas Co. at Port Lavaca, one for the same in the Manvel Field, one in New Mexico for the Repollo Oil Co. and one for the Shell Petroleum Corp. in the White Castle Field.

L. W. Capps is moving in a rig for a wildcat test in Orange County for Dick Schwab, after abandoning the wildcat test of Arkansas Fuel Oil Co.'s No. 1 Herman W. Peschel, in Austin County, at 4,010 feet.

Rutherford Drilling Co. has one rig running for the Skelly Oil Co., located in the Sam Fordyce Field in Hidalgo County.

Harvey and Rush are drilling below 4,800 feet on a wildcat test of Frazier and others in Hardin County. In the same county they are moving in a rig for another wildcat test for the Kirby Petroleum Co.

Carlisle & Williams are drilling below 3,100 feet in a hard-rock well for the Plateau Oil Co. in Bandera County.



Lon Cron and Eulan Gracey may not have known it, but O. B. Weems, Louisiana drilling superintendent for Cron & Gracey, attended the Houston Oil Equipment and Engineering Exposition. He was early discovered by his old friend, C. S. (Cleve) Campbell, representative of Mission Manufacturing Co., and the two were photographed in front of the Gardner-Denver booth. Weems explained the boots by stating they have to be worn in deep Louisiana to keep the crawfish out of one's shoes

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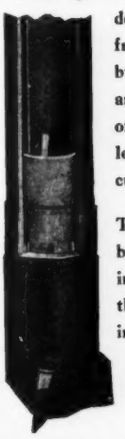

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Outcome of Port Lavaca Tests Still Uncertain; Large Producer in Deep Pay at Batson Dome

By F. L. SINGLETON
Gulf Coast Bureau, The Oil and Gas Journal

HOUSTON, Tex., May 13.—The outcome of five tests drilling in the Port Lavaca Field, northern Calhoun County, are still uncertain. While four of the tests have reported showings, only one seems fairly certain of making a producer. It is Texas Co.'s No. 1 H. C. Wehmeyer, approximately 1½ miles southwest of Steinberger Petroleum Corp.'s No. 1 Shofner, a producer in the M. Sanches Survey. Bottomed at a plugged back depth of 6,261 feet, with 7-inch casing cemented at 6,249 feet, the operators drilled the plug, preparatory to testing, but were unable to get the screen and liner to the bottom of the hole, and late in the week were reaming the hole in attempt to get to the bottom of the hole. On a drill stem test made last week it flowed oil through the casing for three minutes. One mile northwest of the Shofner test, the same company's No. 1 R. Duelberg is drilling in sand and shale below 6,330 feet with no shows being reported below 6,276 feet. A drill stem test was attempted from 6,256-75 feet, but the seat failed to hold and the test was unsuccessful. Two other tests being drilled by the company have reached a depth below the prospective producing horizon of the Shofner test, and are looking discouraging. No. 1 Blardone, 2 miles south of the producer in the Samuel Shupe Survey, is drilling in shale below 6,425 feet, with no shows being reported. At this depth it is approximately 187 feet lower than the producing horizon of the field. About 5 miles southwest of the discovery in the Florentina Garcia Survey No. 1 J. A. Martin is bottomed at 6,270 feet and on a drill stem test from 6,239-70 feet it showed considerable salt water. It will probably be plugged back to approximately 6,246 feet, where several cores which were taken from 6,207 feet to that depth, showed some saturation. The Texas Co. added another location to the field, when it staked No. 1 Shofner, a southwest offset to Steinberger Petroleum Co.'s No. 1 Shofner in the M. Sanches Survey. Halliburton Oil Producing Co.'s No. 1 Burton, 660 feet due east of the discovery is coring below 6,144 feet and should reach the pay within the next few days. In a core from 6,124-44 feet, it recovered several feet of sand which carried an odor of oil and gas. It is thought that this sand is the same sand from which the same company completed its No. 1 Stanzel, for a distillate producer.

Steinberger Oil Corp. is reported to have made four tentative locations on the Shofner 100 acre tract and seven tentative locations on the Hartman 90-acre tract.

Anahuac Field

In the Anahuac Field, northern Chambers County, Humble Oil & Refining Co. completed its third producer in the field, when its No. 1 Broussard, a south offset to the discovery well in Section 63, H.&T.C. Survey, was completed at a total depth of 7,125 feet for an initial production of 29 bbls. per hour through a one-quarter inch choke, with tubing pressure 1,400 pounds and casing pressure 2,200 pounds. Seven-inch casing was cemented at 7,070 feet.

Batson Dome

One of the largest producers to be completed in the deep pay on the south flank of the Batson Dome, Hardin County, was marked up at John Deering and others' No. 3 Hooks in the W. Donoho Survey, which was completed at a corrected depth of 5,635 feet, for an initial production of 83 bbls. of pipe line oil per hour for the first 15 hours through a 17/32-inch choke, with tubing pressure 600 pounds. It is an east offset to the same operators' No. 1 Cruse that opened up a new producing level several months ago when it was completed in the Cockfield sand at a depth of 5,567 feet. Sterling Oil & Refining Co.'s No. 1 Cruse, the most westerly test from the dome cored to 5,914 feet, the last 6 feet of which was soft sand showing gas and salt water, and the operators are preparing to plug back into the 7-inch casing that was cemented at 5,678 feet. Sand and sandy shale showing oil was cored earlier from 5,610-19 feet. It topped the Vicksburg at 4,713 feet, the Hockleyensis at 4,888 feet the Cockfield at 5,543 feet and the Upper Saline Bayou from 5,632-50 feet.

Victoria County

The Eastern States Petroleum Co. entered into the Placedo area, Victoria County by purchasing a one-half interest and operating control from the Costa Oil Co., involving approximately 380 acres. The consideration was reported to have been part cash and oil payments. Three of the tracts are located southwest of the discovery well in the W. Rupley Survey, and one tract is southeast of the discovery and south of Magnolia Petroleum Co.'s No. 1 Henderson and Pickering. Northeast of the discovery, location has been made for the company's No. 1 Williams 330 feet out of the south corner of a 130-acre tract in the E. Benevides Survey. About one-half mile southwest of the discovery, Costa Oil Co.'s No. 1 Schovjsa in Lot 14, Wm. Rupley Survey, is drilling in shale below 4,400 feet. Northwest of the discovery in the Nancy Dean Survey, L. A. Gillespie and others' No. 1 Farber cored sand with taste of oil from 4,793-96 feet and is drilling ahead, without testing below 4,800 feet.

In the same county, Hooper and Pool have taken an option on 9,000 acres, centering around the R. Wardemier 407 acre tract in the Jose Leus Carbajoe Survey, and extending across the river in the Jose Maria Escalera Survey. The reported price was 20 cents per acre for a 60-day option on the block.

Refugio County

Three miles south of the McFaddin Field in Refugio County, Humble Oil & Refining Co.'s No. 1 F. B. Marberry in the John Dunn Survey attracted attention to that area by coring saturated sand and is now shut down at 4,446 feet. Sand showing oil was cored from 4,420-29 feet, and on a drill stem test from 4,400-29 feet it tested 180 feet of drilling mud and 6 feet of oily mud through a one-quarter inch choke on bottom and a ¼-inch choke on top, with no pressure being reported. The operators cored again from 4,429-36 feet and recovered oil sand; cap rock was cored from 4,436-42 feet, and saturated sand showing oil was encountered from 4,442-45 feet. The operators attempted to make a drill stem test from 4,400-46 feet but the seat failed to hold. Another test will be made before coring deeper.

South of the Kittrell Field, in Walker County, Boone Brothers' No. 1-D Texas Long Leaf Lumber Co. revived interest in that area, when it tested 60 feet of drilling mud cut with oil, gas and salt water, on a 16-minute drill stem test from 3,645-75 feet. It is not known whether the salt water is coming from the bottom of the hole or above and the operators no doubt will attempt to find the source of the water before another test is made. Although its total depth is several hundred feet lower than the producing depth of the Kittrell Field, which is producing from the Wilcox formation, it is believed to be in the same formation. It topped the Cockfield at 602 feet; Crockett at 1,516 feet, Sparta at 1,890 feet, Weches at 2,164, Queen City at 2,310 feet, Recklaw at 2,585 feet and the Wilcox at 2,877 feet. Location is 330 feet east and 1,275 feet north of the southwest corner of a 112.6 acre tract in the Mary Milsap Survey.

Brazoria County

The second test for the Old Ocean District, southwestern Brazoria County, discovered the latter part of last year by Harrison and Abercrombie was announced by the same operators, when location for No. 2 Bernard River was made 1,000 feet north, 54 degrees west, and 400 feet south, 36 degrees west from No. 1 Bernard River in the Charles Breen Survey. The discovery was completed in the deep Frio pay at a total depth of 8,651 feet and has been producing approximately 300 bbls. per day of 60 gravity oil.

Dickinson Field

Several miles southwest of production in the Dickinson Field, Galveston County, Coast Petroleum Co. is moving in material for an interesting test located 3,416 feet south and 200 feet east of the northwest corner of a 143-acre Stewart tract in the W. K. Wilson Survey.

Turnbull & Irwin's No. 1 Joe Piazza, within the proven limits of the field and located 250 feet south and 460 feet west of Humble Oil & Refining Co.'s No. 1 Jones in the J. S. Sherman Survey, was preparing to core for the sand below 8,000 feet. The test is being drilled on farmed out acreage held by the Gulf Production Co.

Matagorda County

Skelly Oil Co. made location for another interesting test in the Van Vleck Field, northern Matagorda County by staking No. 3-B Cobb, 2,750 feet from the northwest line, and 2,900 feet from the southwest line of the M. Cummings Survey. This field is another deeply seated field that was discovered the past year by the Skelly Oil Co., and No. 3-B Cobb is 2,295 feet northeast of the Discovery well, which was completed for a distillate producer at a plugged back depth of 7,045 feet, after being drilled to a total depth of 7,178 feet.

Manvel Field

Two extensions were marked up for the Manvel Field, Brazoria County, by the completion of two miocene producers. Common Wealth Oil Co.'s No. 1 Nichols, approximately 1,000 feet west of production in Lot No. 2, H. N. Little Survey, topped the sand at 4,002 feet and was completed at a total depth of 4,006 feet for an initial production of 200 bbls. per day through a one-quarter inch choke. Seven-inch casing was cemented at 3,990 feet. It is northeast of a deep test drilled by the Alpha Petroleum Co. that was abandoned sometime ago in the Oligocene sand at 5,827 feet. This makes an important extension to the field and opens up considerable acreage for development. Jay Simmons' No. 1 Stitt, about 1,000 feet north of E. A. Stone's No. 1 McCauley and located in Lot 28, H.T.&B. Survey, cored saturated sand to a depth of 4,008 feet, and is waiting on cement to set after 7-inch casing had been set at 3,990 feet. In the northeastern part of the field, Turnbull & Irwin's No. 1 Hart in Lot 10, H.T.&B. Survey is drilling in shale below 4,550 feet and is reported to be running "high". If this test makes a producer it will extend the deep Oligocene production in the north end of the field approximately 2,000 feet east.

Hardin County

In the extreme northwestern part of Hardin County, Kirby Petroleum Co. has made location for No. 3 Kirby Lumber Co., a wildcat test located 9,850 feet south and 2,330 feet west of the northeast corner of the James Stephenson Survey. This is the third test to be drilled by the company in this survey, and is south of two dry holes.

SOUTH LOUISIANA

A production test was scheduled to make the first part of the week on Texas Co.'s No. 1 Bayou St. Dennis, a deep wildcat test in Central part of Jefferson Parish, Louisiana, that indicated production possibilities last week, when the operators recovered 2,500 feet of oil on a drill stem test from 9,558-72 feet, the total depth. Seven and five-eighths inch casing was cemented at 9,558 feet. If the test makes a producer it will be the deepest production to be developed on the entire Gulf Coast.

In the southern part of the Bosco Field, Oswego Oil Co. completed its second well in this field, when it finaled No. 2 Mouton for an initial production of 45 bbls. per hour through a one-quarter inch choke, with casing pressure 1,400 pounds. It is bottomed at 8,606 feet, with 7-inch casing cemented at 8,575 feet.

In the same section, Superior Oil Pro-

Wildcat Operations on Gulf Coast

Week Ending May 11

RACCOON BEND—AUSTIN COUNTY

Humble Oil & Ref. Co.'s No. 16 Thompson, 289 ft. NE of SW line, 510 ft. NW of SE line, William C. White Sur.
10¾-in. csg. 1,045 ft.; drlg. sand 4,060 ft.

Humble Oil & Ref. Co.'s No. 6 Helmuth, 1,149 ft. from SW cor., 250 ft. at right angles to SW line, William Harvey Sur.
Recovered 250 ft. of oil on drill stem test from 3,345-3,438 ft.

Humble O. & R. Co.'s No. 4 Reese, 150 ft. SW of most easterly NE line, 410 ft. NW of SE line, Wm. Smeathers Sur.
T.D. 4,140 ft.; I.P. 30 bbls. per hour on ½-in. choke; T.P. 190 lbs.; C.P. 470 lbs.

Humble O. & R. Co.'s No. 8-X Diemar, 1,458 ft. from NW line, 357 ft. from SW line of Wm. Harvey Sur.
T.D. 4,185 ft.; P.B. 3,543 ft.; prepare to pump.

Humble O. & R. Co.'s No. 7-X Ollie Wilson, 933 ft. SE from No. 6-X, 250 ft. from NE line, Wm. Harvey Sur.
Cmtd. csg.; T.D. 4,182 ft.; P.B. 2,940 ft.; drilled to 3,140 ft.; 7-in. csg. 3,097 ft.

Humble O. & R. Co.'s No. 14-X Woodley, 354 ft. W from No. 8, 418 ft. from easterly NE line, 375 ft. from most easterly N cor. of lease.
T.D. 4,152 ft.; 7-in. csg. 4,115 ft.; I.P. 75 bbls. per day pumping.

DANBURY—BRAZORIA COUNTY

Shell Pet. Corp.'s No. 3 Haury, 800 ft. SE of No. 2 in line with No. 2 and No. 1 Blakely-Winston, H.&T.B. Sur. No. 13.
Abd. 5,974 ft.

DAMON MOUND—BRAZORIA COUNTY

Robert J. Cummins' No. 1 R. T. Mukahy heirs, 300 ft. SW line and 300 ft. from SE line of 100-ac. lease, A. Darst Creek Sur.

(Continued on Page 130)

ducing Co.'s No. 3 C. B. Hernandez was completed at a total depth of 8,575 feet, for an initial production of 405 bbls. per day through a 10/64-inch choke, with tubing pressure 1,875 pounds and casing pressure 2,500 pounds. The company's No. 2 Prejean, the most southerly test in Section 34, was tested at 8,570 feet, and started making considerable gas with a small amount of oil. The tubing is being pulled and will be lowered in attempt to take in more of the oil sand. Three other tests have reached the sand and are waiting on cement to set, preparatory to testing.

One of the best producers to be completed in the Sweet Lake Field, in Cameron Parish was made at Pure Oil Co.'s No. 12 Yount Lee in Section 12-13s-3w. It was originally drilled to 8,196 feet and was plugged back to 7,360 feet, where it was completed for an initial production of 35 bbls. per hour through a $\frac{7}{8}$-inch choke, with casing pressure 795 pounds. This is the first test to be completed in this field for several months.

Stanolind Oil & Gas Co. (Johnston and Johnston) No. 1 Fee Land, a wildcat test in the South Houston District in the H.T.&B. Survey No. 5, Harris County, is plugging back from 5,069 feet, the total depth to 4,969 feet in attempt to straighten the hole which was found to be off vertical below 4,900 feet. A protection string of casing will be cemented at about that depth in order to keep the hole from caving.

Completions Slow in Central West Field; Ten Reported From Kentucky Districts

By GEORGE A. WHITNEY
Staff Correspondent, Central West Fields

FINDLAY, Ohio, May 13.—In Seneca County, Ohio, in the Tiffen Field, R. C. Jones is in the Trenton lime formation at 1,374-89 feet with a light gas volume and filled up 100 feet with oil the first 24 hours. It will be treated with acid. In the same field Industrial Gas Co. is shut down at 100 feet in No. 2 Frank Sherger farm, Section 32, Liberty Township. Phillips and others have a rig for No. 2 James D. Watson farm, Section 1, Hopewell Township.

Wyanco Oil & Gas Co. has a rig for No. 5 Gotlieb Seiler farm, Section 34, Crane Township, Wyandot County. Upper Sandusky Oil & Gas Co. has a rig for No. 6 on the N. and H. Saltsman farm, Section 28, same township, and Newcomer and others have a rig for No. 1 Myrtle Williams farm, Section 33, same township. Murphy & Sons have a rig for No. 3 R. and R. Criswell farm, Section 17, Tymochtee Township. In Pitt Township, Wood and others are shut down at 1,100 feet on the Edward Orton farm, Section 22. In Salem Township, Bosse and others are reported drilling below 100 feet on the E. E. Kear farm, Section 16.

In Hardin County, Bert Sheldon has a rig for No. 2 Ora Bush farm, in Section 31, Blanchard Township. Sims Oil & Gas Co. is drilling below 550 feet in No. 1 Mary Beach farm.

In Wood County, L. Hillie shut down No. 1 H. Linkey farm, in Troy Township, at 1,287 feet.

CENTRAL OHIO

In Holmes County, Lloyd S. Findley's No. 1 fee, Section 23, Mechanic Township, found a broken formation in the Berea sand from 870-88 feet, and is dry. Lydic Oil & Gas Co. has a rig up for No. 2 on the Gladys McDowell farm, Section 26, Munroe Township.

In Tuscarawas County, Capital Drilling Co. is drilling No. 6 on the Stewart Asher farm, Lot 19, Washington Township. In Fairfield Township, James Upham is shut down at 4,200 feet in No. 1 on the Alfred C. Uhlers farm, Section 4, and Status Development Co. shut down No. 1 on the Fairfield Brick Co.'s land, same township, at 4,780 feet. Mike Hardwick is drilling No. 2 Larson B. Zimmerly farm, Section 21, Perry Township. John Marks found a gas well in No. 1 John A. Hart farm, Section 22, Oxford Township, at 1,191 feet.

In Gallia County, Penn-Ohio Gas Co. is drilling No. 1 Cyrus Swisher farm, Section 25, Addison Township. Bowers and others are drilling No. 2 Ella M. Donnally farm, Section 34, same township. H. E. Hamilton and others' No. 1 Ella S. Jones farm, Section 31, same township, is drilling.

In Scioto County, Leaton & Slater are drilling on the James Cutlip farm, Section 32, Madison Township.

In Lawrence County, Shale Development Co. has a rig for No. 1 on the William P. Booth farm, Section 21, Union Township. R. Straub is drilling on the Caughlin Hunt farm, Section 35, Windsor Township.

In Stark County, East Ohio Gas Co. is drilling No. 1 T. and R. Scheetz farm, Section 3, Jackson Township. Same company is drilling No. 2 George Ledithermann farm, Section 11, and No. 1 T. and R. Scheets farm, Section 3, same township. In Perry Township, White & Lyons are fishing at 4,000 feet in No. 1 Hattie Leaman farm, Section 26.

In Pike County, Bachelor & DeWitt are drilling No. 1 J. D. Shilling farm, Section 22, Beale Township, and in Union Township, Goddard & Co. are drilling No. 1 Ryland Creel farm, Section 7, Union Township.

In Trumbull County, Kime and others are drilling No. 1 Lawrence Booth farm, Section 24, Vienna Township.

In Belmont County, E. D. Crouch and others are drilling No. 3 Boyd-Majors farm, Section 21, Kirkwood Township, and A. J. West and others have a rig on the Ensel O. Perkins farm, Section 17, same township. Ohio Fuel Gas is drilling No. 1 George Bright farm, Section 27, Warren Township.

KENTUCKY

Ten completions were reported from the Kentucky Field, seven oil wells with an initial of 510 bbls., two gas wells and one dry.

In Ohio County, Snowden-McSweeney Co.'s No. 14 on the H. J. O'Dell 365 acres produced 100 bbls. initial, and same company's No. 13 on the same farm came in for gas from the Jackson sand. Same company's No. 6 Kate Roberts farm, same field, produced 115 bbls. initial. W. E. Hupp and others' No. 30 on the J. W. O'Dell farm, was a gas well. Same company's No. 31 produced 25 bbls. Inland Oil & Gas Co.'s No. 1 C. R. Rhodes farm, in the Deanfield Pool, same field, produced 10 bbls. Stewart & Gealey's No. 11 on the J. H. Roberts farm, near Oak Station, same county, produced 75 bbls. initial. Petroleum Co.'s No. 2 on the Bellamy heirs farm, produced 15 bbls. Cumberland Petroleum Co.'s No. 16 Sidney Lancaster farm, in the Oak Pool, same county, was dry.

In Hancock County, Joseph B. Mayer's No. 14 on the J. W. Matthews farm, produced an initial of 160 bbls.

INDIANA

In Busseron Township, Knox County, Indiana, National Consumers Co.'s No. 1 B. H. Yates farm, SE SE Section 15, produced 50 bbls. initial. Gardner Petroleum Co.'s No. 1 Effie Taylor farm, Section 12, is a gas well, and same company's No. 1 Burton Blann farm, Section 14, same township, is a gas well. M. E. Blann's No. 1 C. E. Beard farm, NE SE Section 15, same township, is a gas well.

In Pike County, Claud Noble is drilling No. 3 Edward Adams farm, NW NE Section 20, Washington Township.

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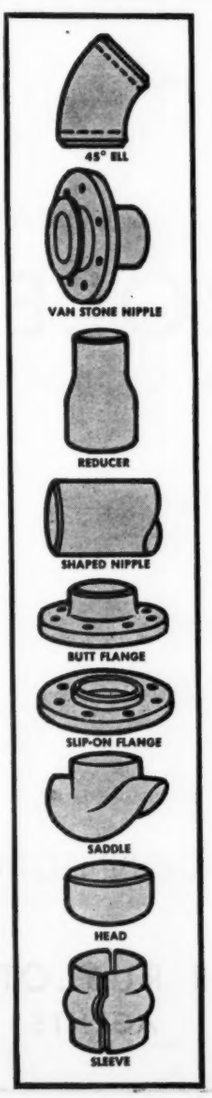

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AGENTS

Production Situation in California Unsettled Due to Uncertainty Over Marketing Agreement

By L. P. STOCKMAN
Staff Correspondent, California Fields

LOS ANGELES, Calif., May 13.—June 15 is only a little more than a month away. To many this may only mean another milestone along the roadway of life but to California producers, refiners and marketers it marks the turning point of another year of either profit or loss because on that date the Pacific Coast marketing agreement expires. As has been stated, California operators can write their own ticket if they so desire. Unfortunately, a small minority can always upset the apple cart and disrupt the constructive action of the majority. This is particularly true at the present time because of the fact that three refiners have refused to sign the supplementary agreement which subjects all members of the agreement to heavy fines for violation of the marketing agreement which provides for strict adherence to crude oil curtailment and the maintenance of normal prices. These three refiners have sufficient gallonage to prevent consummation of a new marketing agreement which would stabilize prices for another year and thus the status of the marketing agreement is still in doubt.

Executives Optimistic

Executives of the larger companies who realize the advantage of extending the life of the marketing agreement are still optimistic despite the present attitude of the three marketers as they feel that refiners who have recorded profits last year cannot refrain from renewing the agreement even though it is in a modified form.

Economically and financially, it would be to the advantage of the three marketers who are holding out to sign on the dotted line but they feel that they are being discriminated against from a crude oil curtailment standpoint and for this reason have indicated they will not become parties to the revised marketing agreement which is supposed to become effective upon expiration of the existing agreement on June 15. For several months, major operators cut down their own production in order to permit one of these operators to overproduce but this practice has been discontinued as it tended to establish a bad precedent. Fundamentally, the marketing agreement rests on the validity and observance of the crude oil curtailment program in as much as the source of supply in many cases is the fly in the ointment. If a small number of producers and refiners refuse to abide by curtailment and persist in cutting prices the new marketing agreement cannot be put into effect.

Production Situation

There has been a tendency during the past month toward optimism because crude oil production in the state has been somewhat below the allowable. This is somewhat of an erroneous impression because the underage during this period has been due partly to the tanker strike and because of a revision in the method of allocating production in the Kettleman North Dome Field. Production of the Ventura Avenue Field has been cut just about in half due to the inability of operators to move current production as all of the major portion of the production of this field moves to refining centers by tankers.

The situation at Kettleman Hills is the result of an order of the petroleum administrator that wells in this field must be brought into line as far as the gas oil ratio is concerned.

For the past several years, operators have taken a survey of conditions along about the middle of January and entertain hopes that the forthcoming 12 months will be more satisfactory. And for the past several years, something has always developed to throw cold water on preliminary expectations. This is particularly true of existing conditions because a few months ago Montebello and Playa Del Rey were unknown quantities and without this development the situation looked rather promising. It is quite obvious that these two fields hold the key to the future notwithstanding the fact that both will be subjected to strict curtailment. Contours, based on the top of the oil sand, indicate that Playa Del Rey will continue to play an important part in drilling and production activities during the remainder of the current year. Montebello is still more or less of an unknown quantity but has possibilities even greater than Playa Del Rey and consequently may become of greater importance.

The tideland drilling angle has been pushed to the front again and a committee of the California assembly has recommended that the state grant permission to operators to exploit the Huntington Beach tidelands by erecting drilling islands out beyond the high tide line.

It is quite obvious that the plan to exploit the Huntington tidelands is directly aimed at the Standard Oil Co. because this company owns the land right down to the water's edge and is therefore in a position to exploit this subsurface deposit by directional drilling. This company discovered the Huntington Beach Field and should be allowed to develop the tidelands by directional drilling as it has consistently agreed that it is willing to pay the state a fair royalty. The people of the state have twice voted down a proposition to permit tideland drilling in order to preserve the beaches for the greatest good and now the legislature proposes to void this mandate and permit tideland exploitation.

Playa Del Rey

Operators in the Playa Del Rey Field of Los Angeles Basin are showing a lot more caution than has been the case with other basin fields and as a consequence the eastern limits of production are still undetermined. Up to the present operators in this field have been hugging the axis of the structure but from now on they will have to move out on the flanks and farther down on the dip. This work will prove or disprove certain acreage and definitely indicate the extent of the structure in the eastern end of the field. Three tests in the eastern end of the field have logged tangible evidence of faulting and for this reason operators are watching developments very closely. These well logs indicate that there is a downward displacement in the area east of a line bisecting the axis of the structure in the vicinity of Manchester Avenue. The real importance of this fault has not yet been determined but some idea should be gained within the next 15 days.

The fault mentioned above has been definitely cored but it is still too early to say just how much effect it will have on production in as much as wells east of it have logged oil sand. The oil sand was picked up somewhat deeper but appears to show promise of resulting in commercial production. The Ritelube Oil Co. cored a fractured shale body at 6,871-6,933 feet which showed dips ranging all the way from 30 degrees to 70 degrees. The oil sand was picked up in this well at 6,953 feet and it was bottomed at 6,975 feet preparatory to an early production test. This is approximately 500 feet deeper than the depth at which wells are finished in the area located about 1,500 feet to the west. If the fault in the eastern end of the new extension proves to be a determining factor it is quite probable that operators will move south of present development. As a matter of fact the area south of present development and west of Manchester Avenue is located well within production contours and offers more inducement than acreage east of Manchester Avenue. Developments during the next few weeks should prove very interesting. In the extreme eastern end of the structure, the Allied Petroleum Co. recently spudded in its No. 17 and this hole is already 2,000 feet deep.

Montebello

The extent and productivity of the eastern extension of the Montebello Field of Los Angeles Basin should be fairly well determined within the next 60 days. As a matter of fact, the Texas Co. should be in a position to make a good guess well within this time limit as its No. 1 Whittier is already down below 1,000 feet. This outpost is located about 1,000 feet east of the Universal Consolidated's No. 2 Nutt and should consequently prove of extreme importance. Nearly all operators agree that there is a productive area east of present production in the Montebello Field, but no one can definitely say just how important it will be or just how far it will extend to the east. The Texas Co. is to be congratulated on undertaking this drilling because it stands to make a lot of money on the deal or lose very little. Other companies will spend several hundred dollars in wildcat exploration but when it comes to laying down the cash for semiproven acreage they think the price is too high.

East of the Texas Co.'s test, the Woodward Oil Co. has erected a wooden rig and is at present installing rotary drilling equipment preparatory to an early spud. Another few weeks should determine the extent of this field. Down in the Manhattan area the Doyle Petroleum has the boys guessing as to what it has found because the company has clamped down the lid on all geological data.

Down in the Newport district, the Wilshire Oil Co. ran into a gas pocket at 310 feet and the gas blowout partially wrecked the rig and equipment. Remedial work is now under way and drilling should be resumed within the next few days. From a practical standpoint this blowout does not mean much unless the next 100 feet shows an oil sand.

Long Beach

Several new wells were finished in the Long Beach Field during the past week and most of them registered commercial production. The Alum Rock Oil Co.'s No. 1 Signal was brought in pumping 348 bbls. of 26.1 gravity oil per day from 4,600 feet after the hole had been finished with a 4¾-inch liner carrying 748 feet of perforated. The Kiowa Petroleum's No. 2 Long Beach, another pumper, was good for 535 bbls. of relatively clean 26.9 gravity oil per day upon completion at 4,138 feet. The 7-inch casing in this well was perforated at 4,082-4,132 feet with a Lane-Wells gun. The Sentinel's No. 2 Mastodon proved good for 378 bbls. per day when put on the beam at 4,275 feet after the hole had been finished with a 5-inch liner including 80 feet of perforated. The Twentieth Century Oil Co.'s No. 1 Signal, bottomed at 4,722 feet but plugged back to 4,650 feet, was brought in pumping 220 bbls. of 26.2 gravity oil cutting 5 per cent after the hole had been completed with a 5¾-inch liner carrying 370 feet of perforated. During the early part of the past week the Southern California Drilling Co. recompleted No. 2 Miller after plugging back the hole from 4,972 feet to 4,670 feet and the well was returned to production pumping 264 bbls. of 26.8 gravity oil cutting 24 per cent.

Belridge

The North Belridge Field of Kern County appears destined to experience a rather active summer if operators pro-

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	April 28		April 21			
Intercoastal-domestic:	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Fuel oil	.....	.....	.....	.....	.....	5,336,881
Diesel and gas oil	.....	.....	.....	.....	527,098	850,016
Gasoline	393,303	56,186	330,818	47,260	2,427,467	1,947,367
Kerosene	78,760	11,251	44,859	6,408	592,040	502,880
Other finished oil	.....	.....	.....	.....	.....	15,171
Foreign exports:						
Crude oil	180,760	25,823	95,939	13,706	3,474,733	2,448,614
Fuel oil	326,232	46,605	8,541	1,220	3,597,350	3,895,544
Diesel and gas oil	179,324	25,618	82,811	11,830	1,299,309	1,331,949
Gasoline	.....	.....	.....	.....	1,488,900	1,295,788
Kerosene	.....	.....	.....	.....	331,731	549,312
Other finished oil	.....	.....	.....	.....	.....	3,529
Other unfinished oil	.....	.....	7,493	1,070	53,206	127,271
Coastwise-domestic:						
Crude oil	322,467	46,067	145,363	20,766	1,892,482	3,528,380
Fuel oil	236,933	33,848	108,868	15,553	2,699,003	3,908,577
Diesel and gas oil	55,028	7,861	35,377	5,054	302,272	311,608
Gasoline	342,417	49,060	288,318	41,188	2,631,511	3,778,017
Kerosene	5,196	742	2,963	423	42,757	54,414

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic:						
Fuel oil	.....	.....	.....	.....	.....	49,995
Diesel and gas oil	.....	.....	.....	.....	157,258	448,113
Gasoline	.....	.....	.....	.....	.....	72,625
Kerosene	.....	.....	.....	.....	149,715	197,498
Asphalt	.....	.....	.....	.....	71,325	.....
Lubricants	.....	.....	.....	.....	12,381	18,331
Foreign exports:						
Crude oil	.....	.....	.....	.....	550,129	666,462
Fuel oil	19,753	2,822	85,029	12,147	546,807	409,366
Diesel and gas oil	.....	.....	8,972	1,282	351,784	580,136
Gasoline	.....	.....	1,992	285	782,360	1,268,923
Kerosene	.....	.....	2,385	341	216,283	302,772
Lubricants	.....	.....	23,842	3,406	74,411	61,382
Other finished oil	.....	.....	.....	.....	.....	2,760
Other unfinished oil	.....	.....	.....	.....	.....	5,750
Coastwise-domestic:						
Fuel oil	332,654	47,522	314,296	44,899	2,087,191	1,144,228
Diesel and gas oil	.....	.....	.....	.....	79,662	87,029
Gasoline	23,127	3,304	125,203	17,886	1,282,360	1,331,488
Kerosene	.....	.....	7,960	1,137	18,109	44,690

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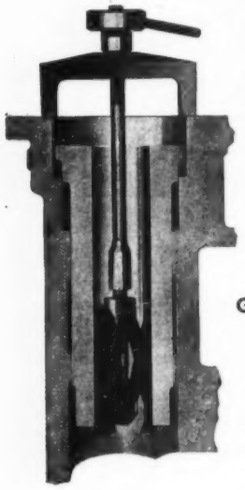

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Name_____ Address_____

Company_____ Position_____

ceed with projected work. The Union Oil Co. has started the erection of two new rigs and plans call for the immediate starting of drilling operations. These new wells will be located in the southeastern end of the field in Section 36-27-20. During the early part of the current week the Standard Oil Co. completed No. 1-A McPhail flowing 1,258 bbls. of 29.8 gravity oil cutting 35 per cent upon completion at 8,600 feet after the hole had been plugged back from 8,618 feet. This new well was originally started a few years ago but work was suspended following the failure to encounter the Temblor. After lying idle for several months, the company resumed drilling operations following the development of commercial production by the Continental Oil Co. a few months ago. Belridge Oil Co.'s projected deep test, No. 32-35, is drilling ahead in brown shale slightly above the 5,000-foot level.

The Shell Oil Co. finished two new wells in the Mount Poso Field of Kern County this week when No. 22 Veder was brought in pumping 735 bbls. of clean 16.4 gravity oil per day from 1,874 feet and No. 23 Vedder was completed pumping 680 bbls. of clean 16.5 gravity oil per day following completion at 1,916 feet. The Shell has No. 24 Vedder ready

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Macrate, A. M., No. 1 Athens, Los Angeles Co.	18- 3-13	6,462	water witch
Republic Pet., No. 1 Lawndale, Los Angeles Co.	18- 3-14	5,004	suspended
Associated Oil Co., No. 3 Inglewood Deep, Los Angeles Co.	7- 2-14	2,820	100 b.d.
Standard Oil Co., No. 4 Inglewood Deep, Los Angeles Co.	17- 2-14	4,090	P.B. 3,696
Standard Oil Co., No. 5 Inglewood Deep, Los Angeles Co.	17- 2-14	6,284	suspended
Standard Oil Co., No. 6 Inglewood Deep, Los Angeles Co.	8- 2-14	3,732	sd. sh. drlg.
Ohio Oil Co., No. 17 Del Rey, Los Angeles Co.	28- 2-15	2,495	sd. sh. drlg.
Bel-Mar Oil Co., No. 1 Del Rey, Los Angeles Co.	7- 2-15	3,162	cleaning out
Harper & Williams, No. 1 Del Rey, Los Angeles Co.	27- 2-15	2,754	sd. sh. drlg.
Coast Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	5,660	sd. sh. drlg.
Dabney Pet. Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	....	bldg. rig
Ritelube Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	6,975	will cmt.
Mathews Pet. Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	5,460	redrlg. 2,931
Birch Royer Oil Co., No. 1 Del Rey, Los Angeles Co.	34- 2-15	4,974	sd. sh. drlg.
Lor-Mar Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	6,701	prod. test
Joyce Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	5,263	sd. sh. drlg.
Union Oil Co., No. 10 Del Rey, Los Angeles Co.	27- 2-15	6,310	completing
Union Oil Co., No. 11 Del Rey, Los Angeles Co.	27- 2-15	5,460	sd. sh. drlg.
Union Oil Co., No. 12 Del Rey, Los Angeles Co.	27- 2-15	....	rigging up
Big Ben Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	6,758	redrlg. 6,129
Doyle Pet. Co., No. 1 Manhattan, Los Angeles Co.	30- 3-14	6,900	O.S. reptd.
West American Oil Co., No. 1 Bandini, Los Angeles Co.	17- 2-12	....	location
Western Gulf, No. 1 Bandini, Los Angeles Co.	16- 2-12	1,875	sd. sh. drlg.
Vanco Dev. Co., No. 1 Artesia, Los Angeles Co.	25- 3-12	3,197	sd. sh. drlg.
Monarch Oil Corp., No. 1 Topanga, Los Angeles Co.	5- 1-16	....	rig suspended
Texas Co., No. 1 Montebello, Los Angeles Co.	5- 2-11	1,898	sd. sh. drlg.
Woodward Oil Co., No. 1 Montebello, Los Angeles Co.	4- 2-11	345	sd. sh. drlg.
Wilshire Oil Co., No. 1 Montebello, Los Angeles Co.	5- 2-11	....	bldg. rig
Frontier Oil Co., No. 1 Pico, Los Angeles Co.	7- 2-11	3,450	sd. sh. drlg.
Pressel & Tull, No. 1 Puente Hills, Los Angeles Co.	30- 2-9	4,300	hd. sd. drlg.
Barstow Oil Co., No. 1 Saugus, Los Angeles Co.	35- 5-16	3,250	will deepen
International Dev. Co., No. 1 Saugus, Los Angeles Co.	34- 5-16	4,335	will P.B.
Platt & Collins, No. 1 Costa Mesa, Orange Co.	14- 6-10	2,560	fish D.P.
Wilshire Oil Co., No. 1 Newport, Orange Co.	29- 6-10	429	blew out
Bartholomae Oil Co., No. 2 East Coyote, Orange Co.	22- 3-10	3,362	cmtd. 3,219
Great American Pet. Co., No. 2 East Coyote, Orange Co.	22- 3-10	3,500	hd. sd. drlg.
Viking Oil Co., No. 1 Richfield, Orange Co.	29- 3-9	854	sd. sh. drlg.
Great American Pet. Co., No. 4 Chino, San Bernardino Co.	7- 2-8	571	sd. sh. drlg.
Trico Oil & Gas Co., No. 3 Delano, Kern Co.	36-24-22	4,535	will P.B.
Trico Oil & Gas Co., No. 4 Delano, Kern Co.	3-25-23	....	rigging up
Associated, No. 1 Kern Front, Kern Co.	23-28-27	1,842	sd. sh. drlg.
Kern River Oilfields, No. 2 Kern Front, Kern Co.	25-28-27	1,847	testing
Getty Oil Co., No. 9 Kern Front, Kern Co.	26-28-27	....	bldg. rig
Republic Petroleum, No. 1 Kern Front, Kern Co.	24-28-27	....	location
Pongratz Oil Co., No. 1 Kern Front, Kern Co.	2-27-27	180	sd. sh. drlg.
Golden Bear Oil Co., No. 1 Kern Front, Kern Co.	32-27-27	4,554	sd. sh. drlg.
Stevens Pet. Co., No. 1 Kern Front, Kern Co.	13-27-27	961	sd. sh. drlg.
Hancock Oil Co., No. 6 Mountain View, Kern Co.	14-30-28	5,181	P.B. 1,550
Hancock Oil Co., No. 7 Mountain View, Kern Co.	14-30-28	....	rigged up
Shell Oil Co., No. 2 Mountain View, Kern Co.	32-30-29	....	bldg. rig
C. C. M. Oil Co., No. 1 Mountain View, Kern Co.	11-30-28	3,151	sd. sh. drlg.
Union Oil Co., No. 6 Mountain View, Kern Co.	9-30-28	7,531	fishing
Union Oil Co., No. 7 Mountain View, Kern Co.	15-30-28	4,380	sd. sh. drlg.
General Petroleum, No. 4 Mountain View, Kern Co.	14-30-28	4,141	sd. sh. drlg.
Vesta Pet. Co., No. 1 Mountain View, Kern Co.	19-30-29	3,000	redrlg. 2,640
Mohawk Oil Co., No. 10 Mountain View, Kern Co.	30-30-28	2,672	sd. sh. drlg.
Hogan Pet., No. 7 Mountain View, Kern Co.	30-30-29	5,491	sd. sh. drlg.
Sovereign Oil Co., No. 4 Mountain View, Kern Co.	30-30-29	1,260	sd. sh. drlg.
Jergins Trust, No. 5 Mountain View, Kern Co.	24-30-28	5,780	sd. sh. drlg.
Standard Oil Co., No. 7 Mountain View, Kern Co.	13-30-28	4,681	sd. sh. drlg.
Ohio Oil Co., No. 1 Mountain View, Kern Co.	33-30-29	5,990	suspended
Ohio Oil Co., No. 2 Mountain View, Kern Co.	33-30-29	1,596	sd. sh. drlg.
Mountain View Oil Co., No. 1 Mountain View, Kern Co.	25-30-28	5,650	fish. D.P.
Jergins Trust, No. 5 Edison, Kern Co.	14-30-29	1,520	pump 420 b.d.
Jergins Trust, No. 6 Edison, Kern Co.	24-30-29	1,727	cmtd. 1,363
Shell Oil Co., No. 5 Edison, Kern Co.	21-30-29	4,979	Schist
Shell Oil Co., No. 6 Edison, Kern Co.	14-30-29	2,979	cleaning out
Shell Oil Co., No. 7 Edison, Kern Co.	14-30-29	....	rigging up
Major Oil Co., No. 1 Edison, Kern Co.	18-30-29	316	sd. sh. drlg.
Chaulk Oil Co., No. 1 Edison, Kern Co.	5-30-29	3,855	cleaning out
Nelco Oil Co., No. 1 Edison, Kern Co.	5-30-29	2,310	sd. sh. drlg.
Mohawk Oil Co., No. 1 Edison, Kern Co.	3-30-29	3,498	dry—abd.
General Pet., No. 5 Edison, Kern Co.	15-30-29	1,175	sd. sh. drlg.
Ohio Oil Co., No. 4 Edison, Kern Co.	4-30-29	....	location
Appling, C. E., No. 1 Edison, Kern Co.	4-30-29	3,016	cmtd. 2,993
Goldman, Frank, No. 1 Edison, Kern Co.	30-29-30	430	hd. sd. drlg.
Woodward Oil Co., No. 2 Edison, Kern Co.	31-29-30	497	cleaning out
Woodward Oil Co., No. 3 Edison, Kern Co.	36-29-29	679	sd. sh. drlg.
General Pet., No. 1 Arvin, Kern Co.	1-32-29	3,351	sd. sh. drlg.
Tejon Ridge Oil Co., No. 1 Comanche, Kern Co.	23-32-29	1,831	hd. sd. drlg.
Hall-Baker Co., No. 1 Arvin, Kern Co.	16-31-30	1,276	P.B. 1,250
Hall-Baker Co., No. 2 Arvin, Kern Co.	17-31-30	....	bldg. rig
Sea Cliff Oil Co., No. 1 Greenfield, Kern Co.	7-31-28	6,000	sd. sh. drlg.
Fullerton Oil Co., No. 1 Semi-Tropic, Kern Co.	1-27-22	....	bldg. rig
Fullerton Oil Co., No. 2 Semi-Tropic, Kern Co.	14-27-23	....	bldg. rig
Standard Oil Co., No. 1 Semi-Tropic, Kern Co.	8-27-23	3,200	gas—shut in
Standard Oil Co., No. 2 Semi-Tropic, Kern Co.	5-27-23	1,171	sd. sh. drlg.
Standard Oil Co., No. 3 Semi-Tropic, Kern Co.	7-27-23	....	bldg. rig
Shell Oil Co., No. 1 Buena Vista, Kern Co.	9-32-25	6,112	cmtd.
Bender, E. L., No. 1 Temblor, Kern Co.	2-29-20	291	sd. sh. drlg.
Reserve Oil & Gas Co., No. 1 Tejon, Kern Co.	2-10-19	3,708	redrlg. 1,600
Reserve Oil & Gas Co., No. 2 Tejon, Kern Co.	12-10-19	2,508	granite—abd.
Taft Well Drlg. Co., No. 1 Kreyenhagen, Fresno Co.	33-22-16	....	rigging up
Standard Oil Co., No. 1 Coalinga, Fresno Co.	13-20-14	681	sd. sh. drlg.
Wellington Oil Co., No. 1 Coalinga, Fresno Co.	14-20-14	1,021	sd. sh. drlg.
Milham Expl. Co., No. 1 Ora Loma, Fresno Co.	12-12-11	4,005	sd. sh. drlg.
Russ Oil Synd., No. 1 Ora Loma, Fresno Co.	28-12-11	5,097	sd. sh. drlg.
Union Oil Co., No. 1 Lillis Kettleman, Fresno Co.	24-21-16	10,944	redrlg. 7,621
K. N. D. A., No. 56 Kettleman, Kings Co.	8-22-18	10,154	redrlg. 10,140
Standard, No. 2 Kettleman Middle, Kings Co.	29-23-19	5,991	sd. sh. drlg.
Continental Oil Co., No. 1 Kettleman-South, Kern Co.	7-25-20	5,752	lr. sh. drlg.
Farrel Pet., Well No. 1, San Luis Obispo Co.	18-31-12	1,610	cmtd.
Willett Oil Co., No. 1 Cholame, San Luis Obispo Co.	10-25-15	3,687	recmtd.
Kings River Oil Pool, Well No. 1, Tulare Co.	29-16-23	3,152	hd. sd. drlg.
Schuster, C. R., No. 1 Tulare, Tulare Co.	27-22-23	....	rig suspended
Kabella Oil Corp., No. 1 Terra Bella, Tulare Co.	12-23-27	750	granite—abd.
Commonwealth Consd. Gas, No. 1 Tulare Lake, Kings Co.	21-22-20	2,490	gas well
Commonwealth Consd. Gas, No. 2 Tulare Lake, Kings Co.	21-22-20	401	sd. sh. drlg.
General Pet., No. 1 Devil's Den, Kings Co.	20-24-18	2,056	dry—abd.
Amerada Pet., No. 1 F. L. D., San Joaquin Co.	15- 2-5	4,420	hd. sh. drlg.
Pure Oil Co., No. 1 Chowchilla, Madera Co.	7-10-14	8,402	gas well—idle
Northern Counties Pet., No. 1 Tehama, Tehama Co.	25-24-3	3,996	hd. sh. drlg.
Texas Co., No. 1 Petrolia, Humboldt Co.	1- 3-2	5,831	sd. sh. drlg.
Shell Oil Co., No. 1 Branch, Monterey Co.	34-24-10	975	sd. sh. drlg.

for a production test following completion at 1,810 feet and should finish No. 25 on the same lease within the next few days as drilling operations have been concluded. The Union is also expected to list a new completion in this field within the next few days as No. 23 S. & M. has been finished at 1,914 feet and the hole is being bailed for a production test. In the Round Mountain Field of Kern County, the Honolulu Oil Corp. has completed No. 35 in Section 18-28-29 and this new producer is pumping 1,028 bbls. of exceptionally clean 15.8 gravity oil per day from 2,211 feet.

Dominguez

The Shell and Union are stepping right along with their development programs in the Dominguez Field of Los Angeles Basin and as a result of projected work these companies have staked locations for 20 new wells. The Shell, which is putting the finishing touches on No. 65 Reyes, has either staked location or has material on ground for Nos. 66, 67, 69, 70, 71, 72, 73, 74, 75, 77, 78, 79 and 80 on the Reyes lease, while the Union has staked locations for additional wells on both the Callender and Hellman leases. Lease obligations in this field are of such a nature that the Union and Shell must continue at a rapid rate in order to complete drilling obligations before expiration of the lease. After expiration of the leases they will be unable to undertake any additional drilling as this privilege reverts to the landowner. This provision was only discovered a few years ago and it caused quite a consternation in the Shell and Union Oil Co. offices. Subsequently, the Burnham Exploration Co. appointed A. C. McLaughlin as general manager and this move has proven to be a wise one because Mac double-checks on the requirements of the lease. The Burnham Exploration Co. has a vital interest in this field as it has a participating interest along with Shell and Union.

Associated Oil Co. put two wells on production in the Inglewood Field of Los Angeles Basin this week and listed another new completion in the Huntington Beach Field. In the latter district, the Associated completed No. 3 Dennison, a new well but the initial daily production. 141 bbls. per day from 4,449 feet, was rather unsatisfactory in as much as production was cutting approximately 43 per cent. In the Inglewood Field the company experienced better luck as No. 60 Vickers, a new well, was brought in flowing 130 bbls. of relatively clean 26.5 gravity oil per day upon completion at 3,675 feet. No. 32 Vickers, an old well, was recompleted doing 101 bbls. of 19.8 gravity oil per day after the hole had been cleaned out to bottom, 2,820 feet, and remedial work undertaken. The Concord Oil Co.'s No. 3 in the Huntington Beach Field was somewhat of a disappointment upon completion at 3,895 feet as it was good for only 131 bbls. of 25.1 gravity oil per day from the completion depth after the hole had been finished with a 5-inch liner including 555 feet of perforated.

Santa Fe Springs

In the Santa Fe Springs Field of Los Angeles Basin, the General Petroleum completed No. 37-B Santa Fe and this new well was brought in pumping 458 bbls. of clean 32.1 gravity oil per day from 3,800 feet after the hole had been plugged back from 3,916 feet and the 6⅝-inch which was landed and cemented at 3,860 feet had been perforated at 3,695-3,750 feet. Oil Oil Co. recompleted its No. 2 White Star in this field but it was good for only 190 bbls. of 31.9 gravity oil cutting 49 per cent. Associated Oil Co. recompleted No. 2 Green a few days ago and this well was returned to production pumping 78 bbls. of 32.8 gravity oil per day from 4,807 feet. No. 4 Dewenter, another recompletion of the Associated Oil Co., was good for 230 bbls. per day on a compressor following recompletion at 4,774 feet.

Operators out on the Kern Front are proceeding with an aggressive development program and it is quite likely that several new wells will be finished in this area during the next 60 days. During the past week, the Getty Oil Co. completed No. 4 Grady, a new well, and this producer was brought in pumping 251 bbls. of 15.8 gravity oil per day from 2,115 feet after the hole had been finished with an 8⅝-inch liner including 235 feet of perforated. Out in the Edison Field of Kern County, the A. T. Jergins Trust completed No. 7 Dougherty, a new well, after plugging back the hole from 1,600 feet to 1,520 feet. This well was brought in pumping 420 bbls. of 16.2 gravity oil per day. In the Ventura Avenue Field, the Associated Oil Co. recompleted No. 31 Lloyd doing 252 bbls. per day from 3,611 feet after reconditioning the hole.

NATIONAL OIL SCOUTS

CORPUS CHRISTI, Tex., May 13.—Several hundred oil scouts and others interested in the oil industry will gather at Corpus Christi May 20 and 21 to discuss the past year's developments and new engineering achievements. The event will be the annual convention of the National Oil Scouts Association of America, Inc., at the Plaza Hotel. The entertainment program will include a boat trip in Corpus Christi Bay, a barbecue, golf tournament, swimming and dancing.

The president of the association is J. E. Beall, Gulf Production Co., Houston, and the chairman of the convention committee is Ken Rowley, United Gas System, Corpus Christi.

STUDENTS VISIT OIL FIELD

TURNER VALLEY, Alberta, May 11. Imperial Oil, Ltd., the Calgary Gas Co. and the Mayland companies entertained the mining students of the University of Alberta with a field trip to Turner Valley, about 50 students participating.

IMPORTANT NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Shell Oil Co., No. 4 Capitan, Santa Barbara Co.	5- 4-30	2,944	prod. test
General Petroleum, No. 14 Capitan, Santa Barbara Co.	32- 5-30	1,332	sd. sh. drlg.
Freeman, M. J., No. 1 Purisima, Santa Barbara Co.	11- 7-33	561	sd. sh. drlg.
Casmite Co., No. 1 Casmalia, Santa Barbara Co.	13- 9-35	1,745	suspended
Scully & Snyder, No. 1 Naples, Santa Barbara Co.	7- 4-29	6,310	gr. sd. drlg.
Barnsdall-Rio Grande, No. 10-88 Elwood, S. Barbara Co.	tideland	3,540	cmtd. 3,530
Barnsdall-Rio Grande, No. 2 Elwood, Santa Barbara Co.	15- 4-29	5,252	no showings
Signal Oil & Gas Co., No. 4 Elwood, Santa Barbara Co.	tideland	631	sd. sh. drlg.
West Elwood Oil Co., No. 1 Goleta, Santa Barbara Co.	9- 4-28	3,715	cmtd. 3,600
Las Posas Pet., No. 1 Las Posas, Ventura Co.	22- 3-20	3,116	will recmt.
Calco Pet. Co., No. 1 Las Posas, Ventura Co.	17- 3-20	....	rigging up
Union Oil Co., No. 1 Bardsdale, Ventura Co.	12- 3-20	1,421	hd. sd. drlg.
Goldray Oil Co., No. 1 Rincon, Ventura Co.	20- 4-24	....	rig suspended
Oil Ridge Oil Co., No. 1 Ventura, Ventura Co.	1- 4-19	1,620	hd. sd. drlg.
El Rancho Oil Co., No. 1 South Mountain, Ventura Co.	9- 3-19	1,030	sd. sh. drlg.
Texas Co., No. 128 South Mountain, Ventura Co.	4- 3-19	6,574	sd. sh. drlg.
Paloma Oil Co., No. 1 Susana, Ventura Co.	12- 2-18	998	suspended
Bolsa Chica Oil Co., No. 2 Piru, Ventura Co.	4- 4-18	2,565	br. sh. drlg.
Continental Oil Co., No. 1 Ojai, Ventura Co.	12- 4-22	2,241	P.B. 1,544
High Mesa Oil Co., No. 1 Ojai, Ventura Co.	16- 4-22	354	sd. sh. drlg.
Prop. Service Corp., No. 1 Lloyd, Ventura Co.	24- 3-23	7,310	gr. sd. drlg.
Continental Oil Co., No. 4 San Miguelito, Ventura Co.	23- 3-24	3,271	sd. sh. drlg.
Standard Oil Co., No. 1 Lost Hills, Kern Co.	2-26-20	3,679	br. sh. drlg.
Continental Oil Co., No. 1 McDonald, Kern Co.	7-28-20	3,470	sd. sh. drlg.
General Pet. Co., No. 1 South Belridge, Kern Co.	30-28-21	11,277	suspended
Standard Oil Co., No. 1-A North Belridge, Kern Co.	36-27-20	8,618	flow 1,251 b.d.
Standard Oil Co., No. 2 North Belridge, Kern Co.	36-27-20	7,161	hd. sh. drlg.
Belridge Oil Co., No. 32-35 North Belridge, Kern Co.	35-27-20	4,890	br. sh. drlg.
Union Oil Co., No. 19 North Belridge, Kern Co.	36-27-20	....	bldg. rig
Union Oil Co., No. 20 North Belridge, Kern Co.	36-27-20	....	bldg. rig
Standard Oil Co., No. 1 Delano, Kern Co.	1-25-23	2,465	gas—shut in
Standard Oil Co., No. 2 Delano, Kern Co.	1-25-23	2,950	sd. sh. drlg.
Standard Oil Co., No. 3 Delano, Kern Co.	12-25-23	....	rigging up
Standard Oil Co., No. 4 Delano, Kern Co.	34-24-23	....	bldg. rig
Trico Oil & Gas Co., No. 1 Delano, Kern Co.	3-25-23	2,525	gas well

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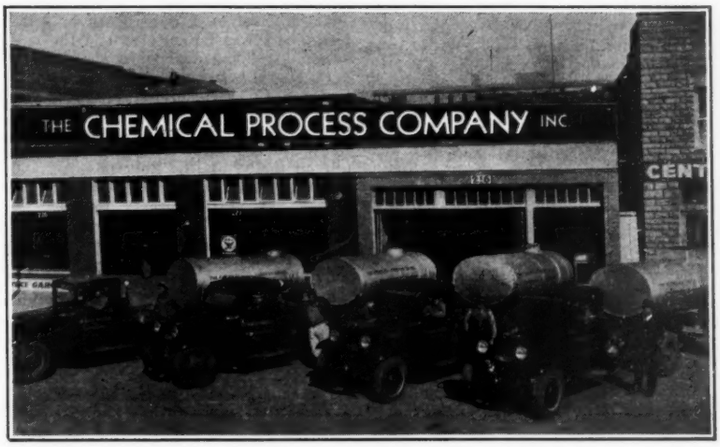

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Twenty Completions Reported in Eastern Field; Best Well of Week Was in Southeastern Ohio

By STAFF CORRESPONDENT

PITTSBURGH, Pa., May 13.—There were 20 completions and six dry holes in the lower eastern fields during the week. Eleven were producers with an initial production of 120 bbls. and nine were gas wells. There is added activity in all districts and new deep tests starting in West Virginia. Southeast Ohio leads in new production.

SOUTHEAST OHIO

The best well for the week in Southeast Ohio was in Coshocton County where Preston Oil Co. completed a test on the William and Maude Frazee No. 2 farm in New Castle Township. It was drilled in the Clinton sand and produced 50 bbls. the first day after shot. This farm is just north of production on the A. J. and B. W. Beatty farm.

In Belmont County, Harry Dague and others completed a test on the Peter Macyszyn farm, NE Section 26, Richland Township, in the Berea sand at a depth of 1,764 feet. It produced 5 bbls. the first day after shot.

In Hocking County, William Stricker and others completed No. 10 on the William Stricker farm, Lot 23, Mary Ann Township, in the Berea sand at a depth of 592 feet. It produced 5 bbls. the first day after shot and will make a 2-bbl. pumper.

In Noble County, G. M. Harper and others drilled No. 3 on the John Schafer farm, SE Section 32, Enoch Township, through the 700-foot sand to a depth of 780 feet. There was a very light showing of oil and it is considered dry.

In Washington County there were several completions. In Newport Township, Section 27, Knob Oil Co. completed a test on the Beatty heirs farm in the Second Cow Run sand at 1,120 feet. It produced 3 bbls. the first day after shot. On Lot 355, Adams Township, in the Muskingum Valley, Wilber Swingle completed a test on the S. J. Boggard farm in the Berea grit at a depth of 1,032 feet. It produced 3 bbls. the first day after shot. In northeast quarter, Lot 42, Salem Township, Montgomery and Miller completed No. 12 on the George Montgomery farm in the Keener sand at a depth of 1,080 feet. It produced 5 bbls. the first day after shot.

In NW Section 11, Barlow Township, Washington County, Ohio Fuel Gas Co. completed a test on the J. F. Lynch farm in the Brill sand at a depth of 1,053 feet. It is a gas well gauging about 105,000 feet a day. In the western part of Lot 1,066, Palmer Township, McCoy & Lochary completed No. 3 on the L. L. Hale farm in the Cow Run sand at 589 feet. It will make about a half barrel pumper. In Muskingum Township, on New Year's Run in Lot 11, Harold Dailey and others completed a test on the Peter Zumbro farm in the Macksburg 500-foot sand at a depth of 1,055 feet. It is a light gas well gauging about 90,000 feet a day. On the same run in Lot 10, this operator completed a test on the Lawrence heirs farm through the Stray sand to a depth of 1,050 feet. It was dry in all sands showing.

SOUTHWEST PENNSYLVANIA

There were several completions in Southwest Pennsylvania, one especially showing fair. In South Franklin Township, Washington County, Duquesne Gas Co. completed a second test on the S. A. Dague farm at a total depth of 2,855 feet. The Fourth sand was struck at 2,800 feet with about 150,000 feet of gas a day showing at 2,814 feet. At 2,829 feet the hole filled with water and 5¼-inch casing was set. At 2,853 feet, the Fifth sand was struck with oil showing at 2,854 feet which filled up the casing 2,000 feet. Drilling was suspended to set a tank as the well is showing for 25 bbls. a day and there is a second pay in this formation.

In Amwell Township, Washington County, the test of Union Gasoline & Oil Corp. on the J. C. McCoy farm proved to be dry. It was drilled to 2,969 feet with the Fifth sand extending from 2,924 to 2,960 feet.

In Greene County, Carnegie Natural Gas Co. drilled deeper No. 1 on the Harvey Lemley farm in Perry Township to a total depth of 3,282 feet. The Bayard sand was at 3,092-3,102 feet with a light gas showing and a small show of oil at 3,095 feet. It was shot but the volume did not increase. In Springhill Township, this company deepened No. 2 on the George Isiminger farm to a total depth of 3,763 feet, the Bayard sand. It is a light gas well gauging only 29,000 feet a day. In Washington Township, this company deepened No. 1 on the Russell Johnson farm to a total depth of 3,420 feet. There was no showing and the hole was plugged and abandoned.

In Richhill Township, Greene County, Lewis & Co. are shut down fishing the tools on the Samuel Chess farm at 1,030 feet. In Gilmore Township, Johnson and Eddy reached 2,190 feet in the second test on the W. L. B. Roberts farm.

In Amwell Township, Washington County, Carnegie Natural Gas Co. is spudding on the R. M. Carrons No. 2 farm. In Center district, Greene County, this company is building a rig on the J. H. Orndoff farm.

In West Bethlehem Township, Washington County, Furman Nuss & Co. drilled the test on the Margaret Keys farm to 4,117 feet. There was no showing of the Speechley sand and the gas in the Bayard Stray sand at 3,307 feet will be saved. It has about 150,000 feet a day.

In East Findley Township, Washington County, Natural Gas Co. of West Virginia reached 2,600 feet on the T. C. Noble farm. In the test on the P. I. Ealy farm drilling stopped at 2,981 feet and it was decided to save the gas in the Fifty-Foot sand. Pitroi Fuel Co. has reached 620 feet on the Harvey F. Taylor farm.

In North Franklin Township, George Bungard & Co. are drilling at 893 feet on the Fred Ward lot. In Morris Township, Carnegie Natural Gas Co. has reached 2,510 feet in deepening No. 1 on the S. L. Harvey farm. F. K. Fawcett and others are rigging up on the Tucker heirs farm in Amwell Township.

In Cecil Township, Washington County, Paul Clay & Co. are drilling at 1,800 feet on the Mrs. W. J. Johnston farm. In this township, Amon & Kaufman and others are down 2,380 feet on the Charles Engle farm.

In Allegheny County, J. F. Trees and others have a rig standing on the Bauman heirs farm for No. 4. This is in Harmar Township. In Butler County, A. F. Isler & Co. have started drilling on the Michael Figler Kotora farm in Buffalo Township. In Beaver County, George Dawson is drilling on the Edward Groves farm in Hanover Township and has reached 400 feet.

In Fayette County, the test of William Snee and others on the Summit Hotel property in South Union Township has reached 1,539 feet and drilling. The log of the past week shows 1,420-78 feet, slate and shells; 1,420-68 feet was hard; 1,478-93, slate; 1,493-1,500, gray sand (Speechley); 1,500-29, gray slate; 1,529-39, hard, gray, pebbly sand (Tiona).

WEST VIRGINIA

There were three producers completed in West Virginia during the week and some reconditioning work. The best well was in the Pike Pool in Clay district, Ritchie County, where G. A. Smith & Co. completed No. 4 on the L. H. Hanlon farm in the top pay of the Injun sand. It is producing 20 bbls. a day with the lower pay not drilled in.

In Mason County, on Sliding Hill Creek in Graham district, Mason Oil Corp. completed No. 3 on the Smith and Petty lease in the Second Cow Run sand at 547 feet. It will make a 2-bbl. pumper, and is 200 feet southwest of No. 1.

In Murphy district, Ritchie County, Creed Barker completed No. 5 on the W. P. Barker farm in the Squaw sand at a depth of 1,859 feet. It will make about a 1-bbl. pumper.

In Gilmer County, All Penn Oil & Gas Co. cleaned out No. 1 on the J. A. Kelly farm in DeKalb district and increased production from 3 to 6 bbls. a day. In Kanawha County on Walnut Creek in Elk district, Virginian Gasoline & Oil Co. shot and cleaned out No. 18 on the J. F. Brown lease and increased production from 6 to 20 bbls. a day.

Gas Wells

In Calhoun County, H. S. Adams and others completed a fair gas well on the Ivy Gainer farm in Center district. It was drilled in the Gas sand at a depth of 1,250 feet and gauges about 1,000,000 feet a day, natural. In Sherman district, L. P. Bickel drilled deeper No. 15 on the Martha Stump heirs farm to 1,917 feet, the Injun sand, and has a showing of 500,000 feet a day, natural.

In Lincoln County, Leonard V. Hobbs, trustee, drilled deeper No. 2 on the Barrett Adkins farm in Jefferson district to the Berea sand at a depth of 2,102 feet. It is a gas well gauging about 178,000 feet a day.

In Mingo County, F. H. Yates drilled a second test on the Richard Vance and Georgia Workman farm on Twelve Hole Creek in Harvey district through the Big Injun sand to 1,510 feet. It was dry in all sands and is being abandoned.

In Wirt County, W. C. Patterson completed No. 24 on the C. E. Vandevender farm in Clay district in the Salt sand and it is a light gas well. In Burning Springs district Service Oil Co. drilled a test on the W. P. Hill farm through the Salt sand and it was dry.

In Wood County, John Leeton and others completed a test on the E. C. Morehead farm in Walker district in the Keener sand at 1,877 feet. It is a light gas well with a showing of about a half barrel of oil a day. It is 800 feet south of the Sarah Lemley No. 1.

Deep Sand Tests

There was one additional deep sand test started in lower West Virginia. In Malden district, Kanawha County, about 2,060 feet east of the Cabot fair gasser in the Oriskany sand on the Campbells Creek Coal Co. tract. Columbian Carbon Co. is rigging up to send No. 14 on the W. D. Lewis to the Oriskany sand. In this district, Godfrey L. Cabot, Inc., is down 250 feet on the Plus R. Levi farm. Owens Illinois Glass Co. is drilling at 1,206 feet in No. 10 on the C. Q. Crockett farm. It is not known whether this will go to deep sands.

In Elk district, Clyde Oil & Gas Co. shut down at 4,767 efet on the F. W. Shinn farm for engine repairs. Yoak Oil & Gas Co. has reached 3,626 feet on the W. T. and J. H. Goshorn farm. Benedum & Trees are drilling out the cement at 4,350 feet on the Mary C. Wingfield farm.

In Louden district, Godfrey L. Cabot, Inc., has reached 1,376 feet on the Edgewood Realty Co. lease, and is building a road to the Kanawha Land Co. tract for a test. In Cabin Creek district, this operator's test on the Arabella D. Huntington lease reached 6,265 feet, the Oriskany sand being drilled through. There is no report of production and the sand is being shot with a bomb.

In Jefferson district, the test of Benedum & Trees on the Joseph Hill farm has reached 2,254 feet and drilling.

Drilling in West Virginia

In Boone County, Pond Fork Oil & Gas Co. is building a road to a location for No. 21 on the Cole and Crane lease in Washington district. Boone County Coal Co. has resumed drilling the second test on its own tract and has reached 2,378 feet. Owens Illinois Glass Co. is down 1,047 feet on the H. C. Vandelinde farm and 2,038 feet in No. 21 on the Cassingham Coal Land Co. Both are in Washington district. In Sherman district this company has started drilling No. 20 on the Leytonia Coal Land Co.

In Cabell County, Sure Shot Torpedo Co. and others have a rig standing on their own acreage in Union district. In Guyandotte district, R. J. Petry and others are down 300 feet on the Virginia Powell farm. In McComas district, W. C. Kingery and others are drilling on the Augusta Beckett farm at 650 feet. Four other wells are drilling in this district, none near the sand.

In Calhoun County, Paul Weekley and others have made a location on the L. W. Little farm in Lee district. In Washington district, Earl Knotts has made a location on the H. H. Bennington farm. J. J. Massey has part material on the ground on the E. P. Cottrill farm. Harper Oil & Gas Co. is drilling at 450 feet on the O. J. Conley farm. In Sherman district, C. B. Lewis and others have a rig standing on the M. J. Kight farm.

In Marshall County, Cameron Light & Heat Co. has a rig standing for a second test on the W. R. Hughes farm in Cameron district. In Clay district, Samuel Morris and others are still reaming the hole at 270 feet on the Ambrose Ferris farm.

In Ritchie County, additional locations were made. In Clay district, Frank Finley and others have a location on the Minnie Gilpin farm. John Deem has made a location on the Milton Hall farm in the same district and McGinnis & Lemon are spudding on the John Kelly farm. In Murphy district, W. H. Bickel has started drilling on the T. J. Ireland farm. On Sheep Run in Grant district, H. N. Rinehart has a rig standing for No. 7 on the F. H. Markey farm. In this district, Mahona and others have made a location on the Thomas Murray farm.

In Roane County, Reedy Oil & Gas Co. is spudding on the Alfred Moore farm and building a rig for No. 7 on the L. M. Riddle farm, both being in Curtis district. K. M. Hunt and others have three wells drilling in this district. No. 3 on the Lizzie Moore heirs farm is at 150 feet; the test on the T. W. Lattimer farm is drilling at 160 feet and that on the T. J. Murray 30-acre tract is down 500 feet. In Spencer district, D. S. Fisher has started drilling No. 3 on the Stella V. Knotts farm.

Coal County Is the Hot Spot in Oklahoma, With Counties in Southeast Maintaining Interest

By JAMES McINTYRE

An 18,000-acre block of leases in Coal County owned by the Carter Oil Co. (50 per cent), Ramsey Petroleum Co. (25 per cent), Stanolind Oil & Gas Co. (12½ per cent) and Mabee Consolidated (12½ per cent) will soon have a test going, as the Carter Oil Co., which will operate the block has made a location for No. 1 Thompson, C S half NE NW Section 34-2n-9e, south of the town of Centrahoma. The Ramsey Petroleum Co. assembled the leases and has been working on the block for about a year. Ramsey geologists worked out a big structure on surface and later it was seismographed.

Another lease block in Coal County for which major companies are dickering with the owner, W. D. Grisso, centers around the SE NW SE Section 28-1s-9, south of Olney. Grisso has just given a 30-day extension to the companies interested in the deal for this property. The Gypsy Oil Co. and Phillips Petroleum Co. are well protected in this area and Sinclair Prairie Oil Co. has paid good prices for small tracts in Sections 31 and 33-1s-9. Some of the acreage close to the Grisso block has sold for as high as $200 per acre.

Oklahoma Production

Estimated daily average production of Oklahoma for the week ended May 11 and for the preceding week follows:

	Barrels	
	May 11	May 4
Allen	8,250	8,350
Asher-West Asher	1,275	1,325
Burbank	8,650	8,750
South Burbank	11,000	11,000
Balance Osage	27,000	27,500
Blackwell	4,800	4,800
Bristow-Slick	9,350	9,350
Chandler	5,500	5,600
Crescent	5,550	5,675
Cromwell	4,500	4,450
Cushing-Shamrock	13,000	12,750
Duncan district	4,200	4,200
Edmond	3,375	2,650
Fish	9,275	8,325
Fitts	10,225	14,075
Gray	1,400	1,650
Graham	3,900	3,950
Healdton	9,250	9,250
Hewitt	4,750	4,750
Holdenville	1,625	1,025
Keokuk	2,000	2,250
Konawa	1,925	2,250
Lucien	9,150	8,925
Marshall-Lovell	1,000	1,000
Oklahoma City	175,150	116,150
Papoose	1,275	1,275
Polo	3,525	3,125
Saskawa and townsite	1,350	2,675
Sholem Alechem	4,000	4,000
Seminole Field:		
Bowlegs	11,400	11,325
Carr City	5,775	4,950
Earlsboro	10,050	10,100
East Earlsboro	9,575	8,950
South Earlsboro	1,100	1,250
Little River	14,100	11,575
East Little River	950	850
Maud	1,250	1,400
Mission	3,075	3,225
Seminole	10,625	10,225
East Seminole	1,075	1,125
Searight	3,575	3,875
Total Seminole	72,550	68,850
St. Louis-Pearson	25,650	22,275
Tatums	5,100	5,000
Tonkawa-Garber-Thomas	6,000	6,000
Wewoka	3,500	3,500
Yale-Jennings	5,000	4,800
Other pools	58,775	57,075
Total Oklahoma	522,825	458,575

Failures in Jackson County

Several wells were abandoned as hopeless in the Jackson County wildcat play that followed the discovery of oil in the Altus area by the Gypsy Oil Co., and a number of others are shut down at various depths, and do not appear to have a chance of getting oil. The only good well completed in the Altus Pool is the discovery well. The pool produced 901 bbls. in January, 3,834 bbls. in February and 5,307 bbls. in March or 10,042 bbls. in 90 days, according to the latest pipe line run statement of the Oklahoma Corporation Commission. The Gypsy Oil Co.'s No. 2 Kelly, SE NE NE Section 10-1n-20w, an offset to the discovery well, swabbed 13½ bbls. per hour for 13 hours on Saturday from granite wash at 1,175-84 feet and the crew was preparing to core ahead. This well may make a better producer than No. 1 Kelly.

W. J. Armstrong, state proration umpire, says that merging of the proration and the oil and gas units of the Corporation Commission into the newly created oil and gas conservation department will be gradual. Consolidation was permitted in a bill signed last week by Governor Marland. During the present week the commissioners are expected to meet and approve by order or journal entry the changes; however, no changes in personnel are expected.

Stanolind Oil & Gas Co. and others completed a good well in the Lucien Pool in Noble County. No. 2 Frederick, C NE SE Section 28-20-2w, found Misener sand at 4,972-82 feet and the well flowed 902 bbls. of oil in four hours and was then shut in.

Seeking Trinity Sand

Southeastern Oklahoma continues to interest operators and two tests are to be started in Choctaw and McCurtain Counties. Burns and others have made a location in NW NW NW Section 4-7s-20e, in the center of a block assembled by Burns. Roy Bocock and others have made a location for No. 1 Pussimicki Bank, NE NW SW Section 34-6s-21w, in McCurtain County. The Trinity sand will be sought in the Choctaw tests. It is believed to lie just below 900 feet on Burns' block. The Trinity sand produces in Marshall County.

Production jumped from 458,575 bbls. a day as an average for the previous week, to 522,825 bbls. as an average for the week ending May 11, an increase of 64,250 bbls. Oklahoma City increased from 116,150 bbls. to 175,150 bbls. The Fitts Pool, which has a rated potential of more than 300,000 bbls., was permitted to produce only 10,225 bbls. per day.

Noble County

Stanolind Oil & Gas Co., Amerada Petroleum Corp., and Darby Petroleum Corp.'s No. 1 DeBord-A, NE NE SW Section 27-22-2w, Polo Pool, Noble County, got the top of the Wilcox sand at 4,860 feet. At 4,870 feet the well flowed 2,281 bbls. in seven hours. It was drilled to 4,896 feet and flowed 847 bbls. in six hours, and was shut in for a potential test.

In the Lucien Pool, Noble County, Magnolia Petroleum Co.'s No. 1 Viets, C SW SW Section 27-20-2w, had first Wilcox sand at 5,081-5,104 feet, total depth 5,134 feet. It was plugged back to 5,098 feet and acidized. It flowed 202 bbls. in 24 hours.

Shell Petroleum Corp.'s No. 1-A Tate, C NW NW Section 29-20-2w, had gone through the first and second Wilcox sands without finding anything but gas in the first sand. It was at a total depth of 5,415 feet. Wilcox was topped at 5,078 feet and 5,209 feet.

Pontotoc County

Morris & Wilson completed a 12-bbl. well in No. 1 Call, 926 feet west and 660 feet north of C Section 22-5-8, Pontotoc County.

Mayfield and others' No. 1 Smith, SW cor. Section 19-5-5, Pontotoc County, is a 35-bbl. pumper producing from Dolomite at 2,640-60 feet. It also produces 35 bbls. of water per day. It was completed. This was an old well deepened from 2,569 feet.

Boettcher Oil & Gas Co.'s No. 1-A Starritt, NW NE NE Section 23-4-7, was completed in sand at 1,701-11 feet. It is a 75-bbl. well.

Radial Oil Co.'s No. 2-A Lee, NE NW NE Section 20-4-8, was completed in sand at 1,520-24 feet. It pumped 225 bbls. of oil and 775 bbls. of water in 24 hours.

In the Fitts Pool

There are over 110 oil wells in the Fitts Pool and the number is being added to almost daily.

Moore and others' No. 1 Patrick, NW

Wildcat Operations in Oklahoma

Week Ending May 11

NORTHERN OKLAHOMA

BECKHAM COUNTY

Fred Coogan et al's No. 1 Shelton, SW cor. Sec. 33-10-25w.
S.D. 3,608 ft.

BLAINE COUNTY

Earl Ingrahm et al's No. 1 Masters, SW NW NW Sec. 27-16-11w.
Drlg. 1,240 ft.

CADDO COUNTY

Denver Prod. & Ref. Co.'s No. 1 Sah-Can, C SE SE Sec. 33-10-10w.
Drlg. 5,190 ft.

H. W. Lee et al's No. 1 Horton, NE NE NE Sec. 9-6-13w.
Rigged up; S.D.

H. W. Lee et al's No. 1 Stacey Ferrell, SW NE NE Sec. 3-6-13w; (2,000-ft. test).
S.D. 2,280 ft. for repairs.

CANADIAN COUNTY

R. Carl Larkin's No. 1 Brobine, NW NW NE Sec. 33-13-5w.
Drlg. 6,031 ft.

CLEVELAND COUNTY

Sinclair Prairie et al's No. 1 Franklin, SE NW SE Sec. 21-10-2w.
Hunton 6,780 ft.; Viola 6,937 ft.; Simpson 6,987 ft.; drlg. 7,100 ft.

COAL COUNTY

J. D. Petty Oil Co.'s No. 1 McMillan, SW NW NE Sec. 16-1s-8.
S.D. 1,368 ft.

GARVIN COUNTY

Anderson & Kerr et al's No. 1 Rodke, NW NW SE Sec. 17-4-1w.
Location.

Anderson & Kerr's No. 1 Newburn, NW SW NE Sec. 24-5-3.
Wilcox 2,933 ft.; H.F.W. 2,945 ft.; P.B. to 2,700 ft.

Charles Carter and W. S. Key, Inc.'s No. 1 Wood, C NW SW SE Sec. 5-4-3e.
S.D. 2,405 ft.

GRANT COUNTY

Helmerich & Payne's No. 1 Crouse, C NE SW Sec. 29-25-5w.
Drlg. 6,116 ft.

GREER COUNTY

M. C. Ent and R. C. Camp's No. 1 Simington, SW SE Sec. 29-6-21w.
T.D. 50 ft.

Glied Oil Co.'s No. 1 Luker, SE cor. Sec. 6-4-21w.
Lost hole 998 ft.; skidded machine and digging pits.

Morgan et al's No. 1 Carder, C SW SE Sec. 19-4-22w.
Drlg. 1,890 ft.

HUGHES COUNTY

Amerada Pet. Corp.'s No. 1-A Adams, NE NE SW Sec. 31-9-9.
First Wilcox 4,271 ft.; second Wilcox 4,307-17 ft., T.D.; H.F.W. from both sands; P.B. to 4,095 ft.; good show oil; acidized and flowed 170 bbls. gross oil in 40 min.; dropped to 60 bbls. oil in 24 hrs.; 16,000,000 ft. of gas; flowed 111 bbls. in 17 hrs. and 5,000,000 ft. of gas; flowed 52 bbls. of oil and 9 bbls. of wtr. in 24 hrs.

Dandridge & Crane's No. 1 Mead, NW NW NE Sec. 17-5-9.
Drlg. 1,425 ft.

Freeman et al's No. 1 Kite, NW NW NE Sec. 8-6-10.
Top sand 700 ft.; show oil; S.D.

Texas Co.'s No. 1 Keaton, NW SW Sec. 4-8-10.
Drlg. 2,475 ft.

KAY COUNTY

Bay Oil Co.'s No. 1 Holden, SW SW SE Sec. 14-28-3.
5-in. 2,945 ft.; drlg. pluga.

J. T. Lindsay's No. 1 Waggoner, NW NW NE Sec. 3-27-1.
Drlg. 500 ft.

KIOWA COUNTY

Henson & Patton's No. 1 Beeler, NE cor. Sec. 11-6-15w.
T.D. 517 ft., lime; S.D.

Henson & Patton's No. 2 Beeler, NW NE NE Sec. 11-6-15w.
Sand 290-315 ft.; T.D.; H.F.W.; S.D.

Rajah Oil Co.'s No. 3 Stone, C SE NE Sec. 24-7-17w.
Drlg. 735 ft.

LINCOLN COUNTY

Carter Oil Co. et al's No. 1 McFarland C-38, SW SW NE Sec. 18-13-4.
Viola 5,197 ft.; drlg. 5,245 ft.

Chester L. Carlock's No. 1 Young, C N½ NW NW Sec. 23-15-5.
R.U. rotary.

Mid-Continent Pet. Corp. et al's No. 1 Nunn, SE SE NW Sec. 25-15-1.
Rigged up.

Chas. Ralph's No. 1 Young, C N½ NW NW Sec. 23-15-5.
Spudded.

Stanolind et al's No. 1 Campbell, SW NW Sec. 3-14-3.
T.D. 5,064 ft.; R.U.; bailing.

Stanolind O. & G. Co. and Amerada Pet. Corp.'s No. 1 Cavanaugh, SE NE Sec. 31-15-5.
Prue 3,516-55 ft.; T.D. 3,661 ft.; R.U. standard tools.

Texas Co.'s No. 1 Palmer, SE SW NW Sec. 28-14-5.
Rig on ground.

LOGAN COUNTY

Anderson-Kerr et al's No. 1 Renfrow, NE cor. Sec. 33-16-4w.
Mississippi lime 6,168 ft.; drlg. 6,278 ft.

Houghton Royalty Co.'s No. 1 Townsite, SW SW SE Sec. 13-17-1w.
Bldg. rig.

Sinclair Prairie and Slick Urschel's No. 1 Koatsch, SW cor. Sec. 23-15-3w.
Second Wilcox 6,322 ft.; T.D. 6,332 ft.; when opened makes 40 to 70-bbl. flows in 20 to 30 minutes.

Slick-Urschel et al's No. 1 Pennington, C SW NE Sec. 10-16-1w.
Simpson dolomite 5,534 ft.; Wilcox 5,581 ft.; no show; lost circulation at 5,587 ft.

J. C. Schaffer et al's No. 1 Hammond, SE SE SW Sec. 10-15-4w.
Viola 6,748 ft.; Simpson 6,800 ft.; drlg. 6,970 ft.

Stanolind O. & G. Co. et al's No. 1 Nunn, SE NW Sec. 25-15-1.
Drlg. 2,597 ft.

MAJOR COUNTY

Indian Territory Illuminating Oil Co. and Continental Oil Co.'s No. 1 Fairview, C E½ SW SE Sec. 32-22-14w.
R.U. rotary.

McCLAIN COUNTY

Anderson & Kerr's No. 1 Newburn, N WSW NE Sec. 24-5-3.
Wilcox sand 2,933 ft.; T.D. 2,945 ft.; hole full of wtr.

NOBLE COUNTY

Marathon Oil Co.'s No. 1 Gilbert, NE cor. Sec. 24-22-2.
Wilcox sand 4,449 ft.; T.D. 4,480 ft.; flowed 1,793 bbls. in 7 days; may deepen.

OKFUSKEE COUNTY

Amerada Pet. Corp.'s No. 1 Jaynes, NW NW SW Sec. 20-10-10.
Hunton 3,690 ft.; 10,000,000 ft. of gas at 3,704 ft.; Wilcox sand 3,932 ft.; T.D. 4,025 ft.; 275 ft. wtr. in hole; P.B. to 3,882 ft.

OKLAHOMA COUNTY

W. H. Atkinson et al's No. 1 Reed, NE cor. Sec. 4-12-3w.
Cored 6,948-54 ft.; hard, tight, white dry sand; dry and abd.

Gypsy Oil Co.'s No. 1 Shock, NW SW SW Sec. 2-14-3w.
Oswego 5,738 ft.; drlg. 5,825 ft.

Sinclair Prairie O. & G. Co.'s No. 1 Corbett, NE NW NE Sec. 17-13-3w.
Drlg. 4,435 ft.

Slick-Urschel Oil Co. et al's No. 1 Owen, SE cor. Sec. 19-13-3w.
Drlg. 4,070 ft.

OSAGE COUNTY

Peters Pet. Co. and Norbla Oil Co.'s No. 1, SW cor. Sec. 15-25-5.
Sand 3,025-40 ft.; Mississippi lime 3,130 ft.; drlg. 3,201 ft.

PAWNEE COUNTY

Trees Oil Co.'s No. 1 Susan Wedd, C SE SE Sec. 27-24-6.
Drlg. 1,415 ft.

PAYNE COUNTY

Marathon Oil Co.'s No. 1 Potts, C SW SW Sec. 27-19-2.
Top Arbuckle 5,085 ft.; T.D. 5,116 ft.; P.B. to 4,550 ft.; set 6-in. 4,489 ft.; drilled plug and got wtr.; P.B. to 4,516 ft.; H.F.W.

PITTSBURG COUNTY

Choctaw Gas Co.'s No. 1 Bunyard, SE SE NE Sec. 18-7-18.
Drlg. 1,305 ft.

(Continued on Page 115)

NW NE Section 31-2-7, was completed after it had tested 385 bbls. in one hour through casing. It had Bromide at 3,860 feet, sand at 3,970 feet, and McLish at 4,090-93 feet, total depth.

Same operators completed No. 2 Smith, NE NW NW Section 31-2-7. It had Bromide at 3,960 feet, sands at 4,115 feet and 4,185 feet, and McLish at 4,212 feet. It was a light well for that field, as it made only 337 bbls. in four hours through casing. Same operators' No. 3 Smith, NE NE NW Section 31-2-7, did better as it flowed 464 bbls. in three hours. Bromide was topped at 3,985 feet and sands at 4,090 feet and 4,195 feet, and McLish at 4,226-39 feet, total depth.

Moore and others' No. 4 Smith, NE NE NW Section 31-2-7, flowed 394 bbls. the first hour and 315 bbls. the second, through casing, and was completed. Bromide was found at 3,880 feet; sands at 3,975 feet and 4,070 feet, and McLish at 4,107-15 feet, total depth.

Sunray Oil Co. and Mid-Tex Oil Co.'s No. 1 Curtis, SW SE NW Section 13-1-7, a wildcat, had Bromide at 3,897 feet; sands at 3,968 feet and 4,090 feet, but no oil or gas. It was drilled to 4,471 feet and abandoned.

New work in Pontotoc County included Sunray Oil Co.'s No. 17 McCall, 1,140 feet from the north and 90 feet from the east lines of NW quarter Section 17-5-8, a location; Morris & Wilson's No. 2 Call, 1,120 feet north and 1,010 feet west of C Section 22-5-8, set pipe at 230 feet; Phillips Petroleum Co.'s No. 13 Norris, SW NW SW Section 25-2-6, cellar and pits; Stanolind Oil & Gas Co.'s No. 1 Norris-A, SE NE SE Section 26-2-6, location; Moore and others' No. 1 Witherspoon, NW SE NW Section 31-2-7, location.

Osage Completions

Norbla Oil Co.'s No. 2, NW SW SW Section 27-20-10, Osage County, was a hole full of water at 2,521 feet, total depth, and was abandoned. Siliceous lime was topped at 2,482 feet. There was a small showing of oil in that formation but acidizing failed to bring out oil in quantity.

Barnsdall Oil Co. has a 45-bbl. completion in No. 27, 410 feet north and 660 feet east of C Section 30-21-9, in sand at 356-66 feet. In the same pool, Johnson Oil & Refining Co. has a 20-bbl. pumper completed in Layton sand at 1,035-67 feet, which was shot. It also had sand at 334-39 feet.

W. C. Norris completed No. 3, 500 feet north and 700 feet east of C Section 29-21-11, which was a 30-bbl. pumper in sand at 2,003-09 feet.

Bay Oil Co. and Norbla Oil Co.'s No. 1, SE cor. Section 24-22-7, was dry and abandoned at 3,018 feet. It had Siliceous lime at 3,007 feet.

Peters Petroleum Co. completed No. 12, CWL NE Section 26-25-9. It was dry and abandoned at 2,777 feet.

Empire Oil & Refining Co. had a failure in No. 1, SE cor. Section 34-26-3. It had a small showing of oil in sand at 2,540-97 feet, but also water, and was abandoned.

New work in Osage County included Barnsdall Oil Co.'s No. 28, 330 feet north and 58 feet east of C Section 30-21-9, ran 8-inch casing to 257 feet; Lewis Production Co.'s No. 5, SW cor. Section 9-24-7, spudded.

Lincoln County

In the Gessman Pool in Lincoln County, Texas Co.'s No. 3 Gessman, NE SE NE Section 33-14-4, was acidized and shot in Cleveland sand, the pay in that pool, but it yielded nothing and the hole was abandoned. Cleveland sand was topped at 3,055 feet and the total depth was 3,062 feet. Same company's No. 1 Hughes, NW NW NE Section 34-14-4, was dry and abandoned at 4,240 feet. Bartlesville sand was topped at 4,215 feet. It had a small showing of water and no oil. The Cleveland sand at 3,034-70 feet was dry.

Texas Co. made a location for No. 3 Coyle, NE SW NW Section 34-14-4. Texas Co. had rig on the ground for No. 1 Palmer, SE SW NW Section 28-14-5. It is a wildcat test on a seismograph high.

Oklahoma County

W. H. Atkinson and others' wildcat, No. 1 Reed, NE NE NE Section 4-12-3w, Oklahoma County, was abandoned as dry at 6,954 feet.

Harrell-Davis' No. 1 Little, NE SW SW Section 22-11-3w, a Cleveland sand test, was dry and abandoned at 5,866 feet. There was no showing of oil in the little Cleveland sand they had.

Champlin Refining Co. has rig corners in and cellar dug for No. 1 Whiteside, 1,150 feet from the south and 250 feet from the west lines of NW quarter Section 35-12-3w, in the Oklahoma City Field.

Greater Seminole Field

Murphy Oil Co. completed No. 1 Mayhue, NE NW NW Section 14-9-6, Seminole County. Hunton lime was topped at 3,858 feet, total depth 3,907 feet, late in March. The owners have been working on the well since, treating with acid and giving it swabbing tests. Recently it was re-treated with 3,000 gallons of acid and a 200-bbl. oil load and flowed 226 bbls. in 24 hours after getting rid of the load.

Turman Oil Co. completed a small Wilcox sand producer in No. 3 L. Jones, an old well deepened from 4,215 feet. It had first Wilcox sand at 4,162-4,220 feet and second Wilcox at 4,268-92 feet. It is a 25-bbl. well.

Texas Co.'s No. 4 Calvin, NE NW SE Section 7-8-5, Pottawatomie County, deepened from 4,130 feet to Simpson Dolomite at 4,300-40 feet and acidized, made a very small production and was completed.

Hunton Oil Co.'s No. 1 Garrison, NW SW SE Section 12-7-3, Pottawatomie County, was dry and abandoned at 4,427 feet.

Mohawk Oil & Gas Co.'s No. 1 Walker, SE SE SW Section 7-7-4, Pottawatomie County, was acidized in Hunton lime topped at 3,835 feet, total depth 3,864 feet. It flowed 127 bbls. the first two hours and later flowed 535 bbls. in 48 hours.

Magnolia Petroleum Co.'s No. 7 Reed, SE SW SE Section 30-7-8, Fish Pool, Seminole County, was dry and abandoned at 4,174 feet. It was plugged back to 3,158 feet but when the plug was drilled to 3,190 feet the hole filled with water.

Empire Oil & Refining Co.'s No. 6 Myers, NW NE NE Section 31-7-8, had Wilcox sand at 4,287 feet, early in April. The hole filled 3,500 feet with water and 100 feet with oil. It was plugged back to 4,262 feet and acidized and started off at 219 bbls. in 18 hours from Dolomite. The production fell off subsequently and is down to 50 bbls. a day with about 20 bbls. of water. The well was completed.

Barnsdall Oil Co. was drilling at 1,590 feet in No. 1-A Robertson, NW NE SE Section 30-8-4, Pottwatomie County. Pure Oil Co. is deepening No. 1 Wiley, SE SE NW Section 8-8-5, Seminole County, from 4,101 feet and was drilling at 4,151 feet. It made one bailer per hour of water from the Hunton lime topped at 4,090 feet. Texas Co. was plugging back in No. 1 Brock, SW SW NW Section 25-8-6, Seminole County. It was an old Wilcox sand well at 4,143-51 feet. Eight-inch casing has been set at 3,890 feet and 6-inch at 4,040 feet. Magnolia Petroleum Co. made a location for No. 10 Reed, 1,190 feet from the west and 990 feet from the south lines of SE quarter Section 30-7-8, in the Fish Pool, in Seminole County. Texas Co. made a location for No. 2 Reed, NW NW NE Section 6-6-8, Seminole County. Stanolind Oil & Gas Co. and Amerada Petroleum Corp. made a location for No. 1 Rogers, 1,170 feet north and 990 feet west of C Section 8-6-8, Hughes County.

Mason and others deepened No. 1 Lane, SW NW NW Section 30-5-5, Pontotoc County, from 2,553 feet to Dolomite at 2,650-90 feet. It pumped 50 bbls. of oil and 20 bbls. of water initially and was completed.

Payne County

Amerada Petroleum Corp., Gypsy Oil Co., and H. F. Wilcox Oil & Gas Co. have made a location for a test in the SE SE SE Section 28-19-3, Payne County, on a block comprising the SE quarter Section 28, SW Section 27, NE Section 33, and NW Section 34. It will be a Wilcox sand test.

Coal County

Carter Oil Co. and others have made a location for a wildcat test in Coal County, east of Pontotoc County. It is No. 1 John Thompson, C S half NE NW Section 34-2n-9e.

Jackson and Tillman Counties

A. H. Emenhiser's No. 1 Murrell, SE SW SE Section 17-3n-21w, a wildcat in Jackson County, was abandoned as dry at 910 feet.

J. Garfield Buell and others' No. 3 C. W. Cole, in the Altus Pool, SE cor. NW Section 3-1n-20w, was dry and abandoned at 1,767 feet.

J. Garfield Buell and Herndon's No. 1 Haught, SE SE NE Section 22-1n-16w, Tillman County, was abandoned at 841 feet.

Associated Oil Co.'s No. 1 Harrell, NE NE SW Section 13-1s-21w, was dry and abandoned at 1,240 feet.

Cockburn & Boose's No. 1 Nichols, SE cor. Section 28-2s-19w, in Tillman County, was abandoned as dry at 1,394 feet. Same operators were drilling at 1,170 feet in No. 1-A Nichols, SE cor. Section 28-2s-19w.

Associated Oil Co. was rigging up machine to start No. 1-A Harrell, NE cor. SE Section 13-1s-21w, a wildcat.

In Southern Counties

Westheimer & Daube's No. 4 J. Watson, NE NE NE Section 24-2n-10w, Comanche County, is a 20-bbl. completion from sand at 1,820-42 feet. It produces 41 gravity crude.

Bridwell Oil Co.'s No. 1 Montgomery, SW NW SE Section 11-2s-8w, Stephens County, is a 12,000,000-foot gasser from sand at 2,013-22 feet. It was completed.

Cox & Hamon's No. 2 fee, NW NE SE Section 17-2s-2w, Carter County, had a series of sands from 1,474 to 2,167 feet, total depth, with best pay at 2,065-92 feet, and 2,127-66 feet. It flowed 137 bbls. in 24 hours through 2-inch tubing. The oil is 29 gravity. The well was completed.

Canadian Drilling Co. abandoned No. 1 Woods, SW SE NW Section 12-3s-6w, (corrected location) at 365 feet.

S. T. Urice completed a 1-bbl. well in sand at 137-47 feet in No. 3 Blanton, SE cor. NW NW NE Section 19-3s-2w, Carter County.

Schermerhorn Oil Co.'s No. 34, NE cor. SW SW NW Section 5-4s-3w, in the old Healdton Pool, in Carter County,

"First Time in History!"

The peak of boiler and engine efficiency can always be safely maintained when Sand-Banum is used. The following excerpt of a report from "THE GOLDEN CYCLE CORPORATION", Colorado Springs, Colorado, is but typical of the many satisfied users in varied industries all over the country:

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flowed 115 bbls. the first 24 hours from sands at 1,015-25 feet and 1,057-76 feet, but settled to a 30-bbl. pumper. It was completed. Same company completed No. 13 Smith-Cruse, SW cor. SE SW SW Section 5-4s-3w. It had a series of sands from 915 to 1,085 feet. It is a 35-bbl. pumper of 33 gravity oil.

B. F. Kennedy and others' No. 1 Carson, SW cor. NW Section 29-1n-8w, Stephens County, was spudding.

Bland and others had rotary tools rigged up to start No. 1 Center, NE NE NE Section 6-4s-2, Carter County, a wildcat.

Michigan Fields

(Continued from Page 93)

No. 2 H. J. Hansen test in Home Township, Montcalm County.

Lowell Development Co.'s No. 1 Anton Kallinger, which soon will be started drilling by Edward DuVall, former Oceana County operator, should be located NE NW NE Section 35-7n-9w, Vergennes Township, Kent County, instead of C N half N half NE Section 35.

State Lease Sale

Leases on 3,580 acres of a total of 6,000 offered at auction last week in Lansing were bid in at $9,181, or an average of $2.56 an acre bonus in addition to 50 cents per acre for first year rental netting the State $1,760 more.

Two proved tracts in Section 31, Churchill Township, Ogemaw County, brought $2,705 for 80 acres, or $33.81 an acre, and $2,610 for 87.2 acres, or slightly less. The rest of the bids ranged from $1 to $25, a description on wildcat tracts in Arenac, Mason, Missaukee, Montcalm, Oceana, Ogemaw, Osceola, Saginaw and Wexford Counties, though a few tracts went for $200 to $1,000.

Pipe Line Construction

LOS ANGELES, Calif., May 11.—General Petroleum Corp., which is constructing a new pipe line from Lebec pump station to its Torrance refinery in southern California, will have this installation in use considerably ahead of schedule. The line will be slightly less than 89 miles in length and Macco-Robertson Co. and Lang Transportation Co. were awarded contracts for the entire installation. H. C. Price of Bartlesville, Okla., has the contract for electric welding. He also had the job of welding Standard Oil Co.'s Rio Bravo-Estero pipe line from Rio Bravo in Kern County to tidewater at Estero, 108 miles, of which 96 miles consisted of old pipe salvaged from the Kern-Richmond line, which was reconditioned and welded into 40-foot lengths to facilitate laying and transportation. Standard's Rio Bravo-Estero line, which necessitated the erection of six new pump stations and the erection of 700,000 bbls. of steel tankage at Rio and a similar amount at Estero, was put into operation late in March.

Oklahoma Wildcats

(Continued from Page 113)

McAllister Pet. Corp. et al's No. 1 Chunn, C SE NW Sec. 29-4-14.
T.D. 1,530 ft.; pipe collapsed; S.D.
P. H. Gray et al's No. 1 Lee, NW SE Sec. 12-5-12.
T.D. 1,210 ft.; fishing tools.

PONTOTOC COUNTY

E. M. Blanchard's No. 1 Crabtree, NE SE NE Sec. 27-3-6.
S.D. 2,920 ft.
Philip Boyle's No. 1 McCracken, NE NW NW Sec. 31-5-4.
T.D. 2,170 ft.; set 7-in. csg.
Charles E. Carter's No. 1 Wood, NW SW SE Sec. 5-4-3.
S.D. 2,070 ft.
Continental Oil Co.'s No. 1 McCarty, C SW NW Sec. 13-1-7e.
Location.
Crabb-Craw Oil Co.'s No. 1-A Breco, SE NE SW Sec. 3-4-6.
Sand 1,106-18 ft.; pumped 10 bbls. in 24 hrs.; S.D.
W. A. Delaney et al's No. 1 Fulsome, SE NE Sec. 35-4-6.
Location.
Fleetborn Oil Corp.'s No. 1 Oliver, NE NW SE Sec. 21-4-5.
Bromide 1,895 ft.; sand 2,158 ft.; dry; McLish 2,067 ft.; T.D. 2,229 ft.; dry; P.B. to 1,665 ft.
Mudge O. & G. Co.'s No. 1 Clampett, SW NW NW Sec. 10-2-6.
S.D. 915 ft.
Paramount Oil Co.'s No. 1 Graham, SW SE SW Sec. 13-1-7.
500 ft. wtr. in hole from second Bromide sand at 3,288-98 ft.; top lime 3,357 ft.; sand 3,405-08 ft.; sand 3,473-78 ft.; H.F.W.; P.B. to Hunton and shot at 2,480-2,500 ft. and then acidized; dry.
Gillette & Kroeger's No. 1 Robbins, NE SE Sec. 31-1-4.
Machine.
Gillette & Kroeger's No. 1 Duver, NW SE Sec. 36-1n-6e.
S.D. 1,300 ft.
Southern Oil Co.'s No. 1 Walker, NW NW SW Sec. 11-4-6.
T.D. 1,275 ft.; caving; P.B. to 1,175 ft. and pumped 20 bbls. oil in 12 hrs.

POTTAWATOMIE COUNTY

C. W. James et al's No. 1 Neal, C NW SE SW Sec. 4-5-3.
Wilcox 4,175-4,212 ft., T.D.; H.F.W.; P.B. to 2,739 ft. and ripped 8-in. csg. 2,690-2,700 ft.; H.F.W.; P.B. and swbd. 80 bbls. of oil in 5 hrs. at 2,690 ft.; recmtng. off wtr.; P.B. to 2,600 ft.; drilled to 2,671 ft.; ripped 8-in. pipe 2,666-67 ft.; testing.
Howard Sherman et al's No. 1 Wingo, NE NW SE Sec. 32-10-5.
Wilcox at 4,380 ft.; H.F.W. 4,389-94 ft.; P.B. to 4,360 ft. and shot; pipe collapsed; acidized.

PUSHMATAHA COUNTY

Wm. Ungerman et al's No. 1 Misser, SE SW SW Sec. 35-3s-18.
T.D. 2,950 ft.; to rerun 6-in. csg.

SEMINOLE COUNTY

L. Cooper's No. 1 Chandler, NE SE SW Sec. 4-5-6.
S.D. 1,780 ft.
Ray Dorris and J. T. Hall's No. 1 Dorris, SE SE SW Sec. 31-10-7.
Sand 520-60 ft.; H.F.W.; S.D. 608 ft.
Verser & Clay et al's No. 1 Thomas, NE SE NW Sec. 1-6-6.
S.D. at 2,502 ft.
Wofford Drlg. Co. et al's No. 1 Abbott, NE cor. Sec. 33-8-7.
Rig.

TEXAS COUNTY (PANHANDLE)

Ben F. Ash et al's No. 1 Guymon Townsite, C NE SE Sec. 30-3n-15e; (Cimarron Meridian).
T.D. 2,420 ft.; fishing for drill pipe; rig blown down.

WASHITA COUNTY

Okla.-Midwestern Oil Co.'s No. 1 Dock, SW cor. Sec. 21-8-18w.
T.D. 2,430 ft.; lost tools in hole; rig rebuilt; S.D.
Anadarko Basin Oil Co.'s No. 1 Wolf, NE SW Sec. 23-9-17w.
Rigged up and S.D.
L. P. McWhirter's No. 1 fee, SW cor. Sec. 34-8n-19w.
T.D. 300 ft.; S.D. for csg.

SOUTHERN OKLAHOMA
ATOKA COUNTY

Keaton et al's (Brookshire) No. 1 Rowland, NW NE NE Sec. 18-3-10.
H.F.W. 3,844 ft.; P.B. 757 ft.; treated with acid.
Clark et al's No. 1 Morrison, SE cor. Sec. 32-1-14.
S.D. 200 ft.
Malernee et al's No. 1 D. O. K. Land Co., C SE SE Sec. 36-2s-13.
S.D. 3,115 ft.
H. W. Sears et al's No. 1 Downing, SE NW Sec. 17-1s-14.
Moving in tools.

BRYAN COUNTY

C. B. Welch's No. 1 Collins, NE NE Sec. 19-1s-8e.
T.D. 570 ft.
Trio Oil Co.'s No. 1 Gilbert, SW NE SW Sec. 25-8s-7.
Show oil 494-97 ft.; drlg. 521 ft.

CARTER COUNTY

Bland et al's No. 1 Center, NE cor. Sec. 6-4s-2e.
Rigging up rotary.
Waco Turner's No. 1 Munson, NE NW NE Sec. 35-5s-2w.
Drlg. 3,410 ft. in shale.
Carter Oil Co.'s No. 1 Carter-Williams, SW NE SW Sec. 27-2s-3w (7,000-ft. test).
Drlg. 5,710 ft.

CHOCTAW COUNTY

Burns et al's No. 1 Hallum, NE NW NW Sec. 4-7s-20.
Rigging up.

COMANCHE COUNTY

H. W. Baker's No. 1 Miller, SE SW SE NE Sec. 22-2-13w.
S.D. 120 ft.
Oscar Jones' No. 1-A Sheets, NE SW Sec. 26-3-10w.
Machine.
F. F. Stevens' No. 1 Green, SE SW Sec. 2-1-13w.
Drlg. 1,572 ft.

HARMON COUNTY

Jud Leath et al's No. 1 McConnell, NW cor. Sec. 22-3-24w.
Spudded and S.D.

GREER COUNTY

D. E. Whatley et al's No. 1 Hamilton, NW SE Sec. 25-4-24w.
Cellar.

JACKSON COUNTY

Associated Oil Co.'s No. 1 Harrell, NE NE SE Sec. 13-1-21w.
T.D. 1,240 ft.; lost hole; skidded machine; rigged up.
Buell & Herndon's No. 1 Haught, SE SE NE Sec. 22-1n-16w.
Granite at 841 ft.; abd.
J. G. Buel et al's No. 1 Kizziar, SE SE NE Sec. 2-2n-22w.
Drlg. 1,910 ft.
Burke-Greis Oil Co.'s No. 1 Millbrant, SW NW SW Sec. 31-3-19w.
T.D. 40 ft.
Burk Royalty Co.'s No. 1 Gore, SE NW SE Sec. 2-1s-20w.
S.D. at 1,909 ft.
A. H. Emenheiser's No. 1 Morrell, SE SW SE Sec. 17-3n-21w.
Abd. 910 ft.
Gypsy Oil Co.'s No. 1 Boucher, NW SW SW Sec. 32-1-19w.
Granite wash 1,129-43 ft.; dry; drlg. dry granite wash 1,582 ft.; drlg. 1,816 ft.
Gypsy Oil Co.'s No. 1 Stokes, SE NW SW Sec. 11-1-20w.
Lime 1,709-11 ft.; T.D. 1,722 ft.; S.D.
Loper et al's No. 1 Conrad, NE cor. Sec. 35-1s-19w.
S.D. at 1,320 ft.
Marshall & Burnham's No. 1 Hess, NE SW NE Sec. 27-1s-20w.
Drlg. 1,070 ft.
Palo Duro Oil Co.'s No. 1 Ealum, SW SW SE Sec. 16-2-21w.
T.D. 1,025 ft.; R.U. to deepen.
Robberson & Suppes' No. 1 Walker, SW cor. Sec. 19-4-20w.
Machine.
Selby O. & G. Co.'s No. 1 Mack, NW cor. NW SW Sec. 5-2n-20w.
T.D. 85 ft.; waiting for pipe.
Triangle Oil Co.'s No. 1 Fox, E½ W½ NW Sec. 11-3n-20w.
T.D. 600 ft.; fishing tools.
Whatley & Whatley's No. 1 Holt, NW SW SE Sec. 20-1n-20w.
S.D. 1,430 ft.

JEFFERSON COUNTY

Gypsy Oil Co.'s No. 1 James, SW SE SE Sec. 30-5s-6w.
Drlg. shale 1,380 ft.

JOHNSTON COUNTY

W. A. Delaney et al's No. 1 Diamond, NW NE SE Sec. 5-1s-8.
Drlg. 2,100 ft.

LOVE COUNTY

Amerada and Stanolind's No. 1 W. & D., NW SE SE Sec. 27-6s-2e.
T.D. 1,872 ft.; crooked hole.

MARSHALL COUNTY

Jess Cook et al's No. 1 May, NE NW Sec. 12-8s-5.
Drlg. 75 ft.
Paul Robb's No. 1 Vittetoe, C NE SE Sec. 11-5s-4e.
Top Sylvan shale 5,405 ft.; T.D. 5,461 ft.; S.D.

McCURTAIN COUNTY

J. V. Scrivener et al's No. 1, NE SW SW Sec. 24-6s-21.
Drlg. 956 ft.

MURRAY COUNTY

Equitable O. & G. Co.'s No. 1 Ferguson, NE NE SW Sec. 36-1s-3.
Sylvan shale 223 ft.; Viola 464 ft.; T.D. 465 ft.; waiting for csg.

STEPHENS COUNTY

Wm. Angle et al's No. 1 Cooper, NE NW NW Sec. 23-2-7w.
T.D. 3,406 ft.; moving in rotary.

TILLMAN COUNTY

J. G. Buell et al's No. 1 Haught, SE NE Sec. 22-1-16w.
Drlg. 828 ft.
Cockburn & Boose's No. 1 Nichols, SE cor. Sec. 28-2s-19w.
Abd. 1,394 ft.
Rock Island Ref. Co.'s No. 1 Lynch, C SE SW Sec. 35-1s-16w.
Machine.

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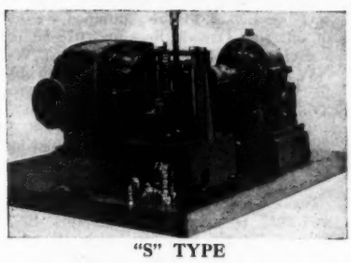

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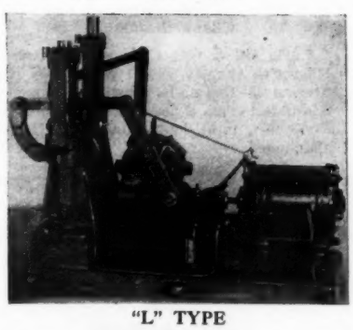

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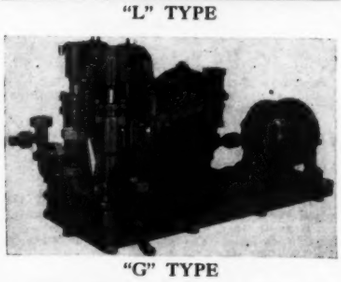

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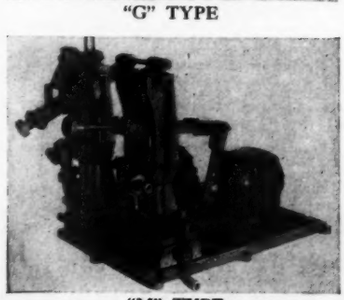

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One New Pool and a Rush of New Work in Rice County; Seismographing in Many Districts

By JAMES McINTYRE

While the production of Kansas continues around 145,000 bbls. per day and the state is producing more oil this year than it ever did before, it is far from producing its capacity. The rated potential production of the state is close to 500,000 bbls. per day, and while it is doubtful if it could reach that figure even if all the wells in the state were opened wide, the real potential is far higher than the 145,000 bbls. to which the state is limited.

In the past week one new pool was opened in Rice County by Allison & Fitzwilliams in Section 4-18-10w, with a 600-bbl. well, producing from Siliceous lime. Rice County led in new work with 14 operations started.

Seismograph parties are working in Ellsworth, Ellis, Barber, Grove Barton, Graham, Thomas, Pratt, Harvey and Reno Counties. Sixty thousand acres of leases have been blocked in Norton and Decatur Counties by H. V. Elwell.

Recent completions have joined up the Chase Groves and Sharpe Pools in Rice County west of the city of Lyons, and they will hereafter be carried as the Chase Pool. The pool is about 5 miles long and contains 126 wells with a potential of 71,000 bbls. per day.

Kansas Production

Estimated daily average production of Kansas for the week ended May 11 and for the preceding week follows:

	Barrels	
	May 11	May 4
Haury-Burrton	24,350	21,625
Ritz-Canton	7,800	9,200
Hollow	4,225	4,750
Voshell	4,650	4,550
Johnson	1,600	1,500
Nikkell	4,875	4,800
Sedgwick County	9,800	8,450
Ellsworth County	5,344	4,360
Barton County	2,450	2,680
Rice County	19,830	19,646
Ellis County	790	91
Kingman County	1,935	1,234
Stafford County	1,650	1,632
Russell County	11,775	13,375
Greenwood County	11,000	11,000
Butler County	18,100	18,400
Other pools	15,676	17,432
Total Kansas	145,850	144,725

Russell County

Six wells were completed in Russell County in the week in review as follows:

Joe Liggett's No. 1 Chrysler, SW NW SW Section 9-11-15w, an old well deepened from 3,105 feet to 3,280 feet. It was acidized at 3,229-80 feet and pumped a potential production of 115 bbls. of oil and 12 bbls. of water.

Stanolind Oil & Gas Co.'s No. 31 Baxter, SW SW SE Section 32-13-15w, pumped 46 bbls. of oil and 70 bbls. of water in 24 hours from Oswald pay at 3,078-81 feet, total depth 3,101 feet.

Billings and others' No. 3 Witt, NW NW SE Section 4-14-15w, had Oswald at 3,012 feet, total depth 3,065 feet. It pumped a potential production of 1,025 bbls. in 24 hours.

Lario Oil & Gas Co.'s No. 2 Neidenthal, SE NE NE Section 23-14-15w, is an abandoned location.

Signal Oil Co.'s No. 2 Sellens, NE SE NW Section 26-15-13w, is a Siliceous lime producer at 3,263-67 feet. It made a potential production of 465 bbls. without acidizing.

Hershey & Ashby's No. 1, Section 34-15-13w, produced 435 bbls. in its potential test from Siliceous lime at 3,316-26 feet. It had not been acidized.

Sinclair Prairie Oil Co.'s No. 1 Sellens, NE cor. Section 35-15-13w, deepened from 2,965 feet to Oswald lime at 3,048-3,104 feet, with pay at 3,075-83 feet, was acidized and made a potential production of 413 bbls. in 24 hours.

Wolf Creek Oil & Gas Co.'s No. 1 Kraft, a wildcat, SW cor. Section 26-16-11w, was a hole full of water at 3,421 feet and was abandoned. Siliceous lime was topped at 3,375 feet. The hole filled 300 feet with oil in 48 hours at 3,396-97 feet but was followed by a flood of water at 3,400-02 feet.

New work in Russell County included Aylward and others' No. 3 Holland, SE NE NE Section 28-13-14w, deepening from 3,311 feet, drilling at 3,325 feet; Empire Oil & Refining Co.'s No. 3 Ehrlich, SE SE SE Section 28-13-14w, building rig; Empire Oil & Refining Co.'s No. 2 Johnson, SW SW NE Section 2-14-15w, building rig; Phillips Petroleum Co.'s No. 1 Amelia, SE SW SW Section 6-14-14w, moving in material.

Near Completions

Hartman & Blair's No. 1 Rusch, NW NW NW Section 34-13-14w, stood with 1,800 feet of oil in the hole from Siliceous lime at 3,314-15 feet.

Texas Co.'s No. 1 Anschutz, NW NW SW Section 1-14-15w, pumped 84 bbls. of oil from Oswald lime at 3,078-83 feet.

Bridgeport Machine Co.'s No. 1 Witt, NW NW SW Section 3-14-15w, swabbed 95 bbls. in 24 hours from Oswald at 3,055-3,105 feet.

Gypsy Oil Co.'s No. 1 Neidenthal, SE cor. Section 14-14-15w, swabbed 229 bbls. in seven hours from Siliceous lime at 3,266-71 feet.

Texas Co.'s No. 1 Gurney, 316 feet north and 322 feet east of C Section 23-14-14w, filled up 600 feet with oil in six hours at a total depth of 3,034 feet.

Ellsworth County

Lario Oil & Gas Co.'s wildcat test in Ellsworth County, No. 1 State, SW cor. Section 29-15-8w, had Siliceous lime at 2,991 feet and a hole full of water at 3,003 feet, total depth 3,004 feet. It was abandoned.

Magnolia Petroleum Co.'s No. 4 Andrea, 330 feet from north and 1,115 feet from the west lines of SW quarter Section 7-17-10w, was a failure in Siliceous lime at 3,368-3,400 feet. It was plugged back to 3,384 feet and acidized without results.

Atlantic Oil Producing Co.'s No. 4 Rolfs, SW NE SE Section 14-17-9w, was completed. It made a potential production of 1,260 bbls. in 24 hours from Siliceous lime at 3,196-98 feet. It was not acidized.

Empire Oil & Refining Co.'s No. 1 Rolfs, SE SE NE Section 14-17-9w, had Siliceous lime at 3,189½-95 feet. It produced 1,451 bbls. in a 24-hour potential test and was completed.

New work includes Atlantic Oil Producing Co.'s No. 6 Rolfs, SE SW NE Section 14-17-9w, moving in material; Empire Oil & Refining Co.'s No. 4 Rolfs, SE SW NE Section 14-17-9w, building rig.

Marion County

Phillips Petroleum Co.'s No. 1 Cowman, 1,656 feet from the south and 305 feet from west lines of SE quarter Section 11-17-4e, Marion County, was dry and abandoned at 2,480 feet.

Rice County

Allison & Fitzwilliams completed No. 1 Stumps, a wildcat, NW NW SW Section 4-18-10w, in Rice County, which opened a new pool. It had Siliceous lime at 3,229-61 feet. It was acidized and produced 218 bbls. in 10 hours. On its potential test the well made 546 bbls. in 21 hours, or at the rate of 636 bbls. per day.

Roy Ramsey's No. 1 Ira, NE NW NW Section 32-19-9w, found Siliceous lime at 3,268 feet, total depth 3,301 feet. It was given a 20-quart shot. On its potential test it produced 320 bbls. of oil and salt water in 24 hours. The well was completed.

Same operator's No. 3 Hilton, SE SE SW Section 6-20-9w, made a potential production of 998 bbls. of oil in 24 hours from Siliceous lime at 3,268-87 feet. It was not acidized.

Foraker & Nicholson's wildcat test, No. 1 M. Lyon, SE SE NW Section 27-20-8w, was abandoned at 3,617 feet. It had a hole full of water from the Simpson sand and no oil appeared in the Siliceous lime topped at 3,559 feet.

C. B. Davis was moving in material for No. 2 Dueser, C E half NE SW Section 31-19-10w; Gypsy Oil Co., moving in material for No. 3 F. Steckel, C E half SE NW Section 31-19-10w; Phillips Petroleum Co. and Indian Territory Illuminating Oil Co., building rig for No. 2 Kramps, 1,172 feet from south line and 330 feet from west lines of SE quarter Section 31-19-10w; Empire Oil & Refining Co., building rig for No. 1 Habiger, SE SE NE Section 20-19-9w; Lebow and others, location made for No. 2 Doll, NE SE SW Section 20-19-9w; Sinclair Prairie Oil & Gas Co.'s No. 5 Volkland, 330 feet from south and 266 feet from west lines of SE quarter Section 20-19-9, deepened from 3,233 feet to 3,245 feet and acidized, pumped 1,160 bbls. of oil in 24 hours; Empire Oil & Refining Co.'s No. 4 Meyers, NW SE SW Section 21-19-9w, location; Magnolia Petroleum Co.'s No. 4 Meyers, NW SE SW Section 21-19-9w, location; Magnolia Petroleum Co.'s No. 4 Beyers, NE SW NW Section 21-19-9w, location; Phillips Petroleum Co.'s No. 6 Link, SE NE SW Section 21-19-9w, rotary rig up; Empire Oil & Refining Co.'s No. 3 Tournear, NE SE NE Section 20-19-9w, location; Empire Oil & Refining Co.'s No. 2 Specht, SE NE NE Section 20-20-10w, location; Empire Oil & Refining Co.'s No. 8 Proffitt, SE NW SE Section 6-20-9w, location; Gypsy Oil Co.'s No. 11 Christopher, SE SE NE Section 6-20-9w, rigging up rotary.

Keith and others' No. 2 Volkland, NE NE SE Section 20-19-9w, pumped 924 bbls. in a potential test from Siliceous lime at 3,225-60 feet which had been acidized, but the well was not a completion.

Sinclair Prairie Oil Co.'s No. 5 Volkland, 330 feet from the south and 266 feet from west lines of SE quarter Section 20-19-9w, deepened from 3,223 feet to 3,245 feet and pumped 1,160 bbls. in 24 hours.

Magnolia Petroleum Co.'s No. 3 Beyers, SE SW NW Section 21-19-9w, swabbed 610 bbls. in nine hours from Siliceous lime at 3,224-39 feet.

Sinclair Prairie Oil Co.'s No. 7 Thompson, SE NE NW Section 21-20-10w, filled up 2,750 feet with oil in seven hours from Siliceous lime at 3,341-44½ feet.

Empire Oil & Refining Co.'s No. 6 Proffitt, NE SW SE Section 6-20-9w, pumped 750 bbls. of oil in 22 hours from Siliceous at 3,254-59 feet.

McPherson County

Dickey Oil Co.'s No. 3 Tull, NE SE SW Section 13-19-3w, McPherson County, was completed. It flowed 153 bbls. of oil in 24 hours from Chat topped at 2,958 feet, total depth 3,020 feet. It was acidized.

Lario Oil & Gas Co. and Shell Petroleum Corp.'s No. 2 Neufeldt, NW SW NW Section 34-21-3w, was deepened from 3,472 feet to Siliceous lime at 3,660-85 feet, but was dry and the hole was abandoned.

Shell Petroleum Corp.'s No. 4 Lovett, 1,314 feet south and 330 feet east of NW cor. Section 13-19-2w, is a 100-bbl. completion in Viola lime at 3,369-72 feet, which had been acidized.

Wildcat Operations in Kansas

Week Ending May 11

(Descriptions are East unless marked otherwise)

BARBER COUNTY

Sam Jarvis et al's No. 1 Morrisse, C SE NE Sec. 23-30-10w.
Rig.

Southern Drlg. Co. et al's No. 1 Davis, 330 ft. from W and 330 ft. from S lines of NE Sec. 13-34-15w.
S.D. 2,865 ft.

L. H. Wentz' No. 1 Skinner, SE NW NW NE Sec. 29-31-14w.
Drlg. 1,550 ft.

BARTON COUNTY

Lario O. & G. Co. and McCoy's No. 1 Dolechek, NE NW NE Sec. 13-16-12w.
Rigged up.

Lario O. & G. Co. et al's No. 1 Nuss, NW SW SW Sec. 11-16-14w.
8-in. csg. 2,335 ft.

Lario O. & G. Co. et al's No. 1 Nuss, NW SW NW Sec. 11-16-14w.
Drlg. 910 ft.

McMorrow & Spencer's No. 1 Hagen, NE cor. Sec. 33-20-11w.
U.R. 5-in. to 3,512 ft.

C. L. Price et al's No. 1 Ehrlich, NW SE Sec. 10-16-13w.
T.D. 360 ft.; fishing.

Pryor & Lockhart's No. 1 Herrington, NE NW Sec. 6-16-12w.
Spudded.

Suppes & Witt's No. 1 Hayes, SW cor. Sec. 7-16-15w.
Drlg. 340 ft.

Torry-Feaster et al's No. 1 Feist, NE SE Sec. 29-18-11w.
Location.

Wolf Creek Oil Co.'s No. 1 Kraft, SW cor. Sec. 26-16-11w.
Siliceous lime 3,370 ft.; 300 ft. of oil in hole at 3,396-97 ft.; S.W. at 3,400-02 ft.

BUTLER COUNTY

Hay & Cameron's No. 1 Johnson, NW NW SE Sec. 16-26-6.
Drlg. 475 ft.

Sanford et al's No. 1 Cron, SE SE SE Sec. 1-28-4.
Drlg. 2,084 ft.

Ward McGinnis' No. 1 Jackson, SW NE Sec. 26-25-8.
Drlg. 600 ft.

Western Kansas O. & R. Co.'s No. 1 King & Marshall, NW NW SW Sec. 11-28-6.
Rig.

CLAY COUNTY

Seidel Bros.' No. 1 Younken, C S½ SE NW Sec. 21-9-4.
Mississippi 1,772-81 ft.; est. 35 bbls. oil and some wtr.; now 5 bbls. oil and 10 bbls. of wtr.

COWLEY COUNTY

Baden, Johnson Roth & Faurot's No. 1 David, NE SW Sec. 35-30-4.
Rig.

Lloyd, Frost & Study's No. 1 Weathered, SW SE SE Sec. 25-31-3.
Stalnaker sand 2,075 ft.; est. 24 bbls. dly. from 2,087-89 ft.; K.C. lime 2,499 ft.; drlg. 2,605 ft.

A. McCoy's No. 1 Brandenburg, SW SE SE Sec. 17-34-5.
Drlg. 2,590 ft.

ELLIS COUNTY

Tom Palmer and Storm King Oil Co.'s No. 1 Ruder, SE NE NW Sec. 17-15-18w.
Rigged up.

Stanolind O. & G. Co.'s No. 1 Penney-Wann, NW SW SE Sec. 12-15-20w.
Rigged up.

ELLSWORTH COUNTY

Lario O. & G. Co. et al's No. 1 Central National Bank, SE NW Sec. 33-15-8w.
Spudded and S.D.

(Continued on Page 129)

Ogden Brothers' No. 1-A Chindberg, NE SE NW Section 18-19-2w, is an 80-bbl. well completed in Chat at 2,982-3,017 feet, pay at 2,994-3,004 feet. It had been acidized.

Shell Petroleum Co. is deepening No. 7 Decker, 330 feet from south and 1,025 feet from west lines of SE quarter Section 11-19-2w, from 3,360 feet and was drilling at 3,364 feet. Carey and the Texas Co. were deepening No. 3 Holt, SW SW SE Section 13-19-2w, from 3,403 feet. Reserve Petroleum Co. was moving in material for No. 1 Anderson, NE SW SW Section 18-19-2w. Youker and others were deepening No. 1 Gratton, SE SW SW Section 24-19-2w, from 3,422 feet; E. B. Shawver had material in for No. 2 Lagree, SE SW SE Section 17-19-1w.

Shell Petroleum Corp.'s No. 1 Wenger, NE cor. Section 2-20-1w, a wildcat, had Viola lime at 3,356-64 feet early in April, and have been testing it. It was recently acidized and made a potential production of 100 bbls. of oil and 620 bbls. of water in 24 hours. It was plugged back to 3,360 feet.

Harvey County

Shell Petroleum Corp. completed No. 2 Schmidt, NE SE NE Section 5-22-3w, in the Hollow Pool, Harvey County, in Hunton lime at 3,495 feet, total depth 3,519½ feet. It made a potential production of 71 bbls. after an acid treatment.

Sinclair Prairie Oil Co.'s No. 8 Martens, SE NW SE Section 19-22-3w, deepened from 3,443 feet to Wilcox sand at 3,566 feet and then to Siliceous lime at 3,643-55 feet, found no oil but a lot of salt water. It was then plugged back to 3,258 feet and tested but got no showing of oil. The hole was abandoned.

Reno County

In the Burrton Pool, in Reno County, Barnsdall Oil Co.'s No. 2 Sabin-A, NE SE NW Section 11-23-4w, was completed in Hunton lime at 3,609-22½ feet. It was acidized and produced 1,145 bbls. of oil, cut 15 per cent in 24 hours. Same company's No. 11 Sabin-B, NE SW NE Section 11-23-4w, another completion, made 1,180 bbls. of oil in 24 hours from Hunton at 3,579-86½ feet, which had been acidized.

Sinclair Prairie Oil Co. abandoned the location for No. 5 Harner, NW NE SW Section 14-23-4w.

Olson Oil Co. and Shell Petroleum Corp.'s No. 2 Johnson, C NW NW Section 24-23-4w, is a 10,000,000-foot gasser with a 10-bbl. oil production from Chat at 3,257 feet, total depth 3,368 feet. It had been acidized.

Deal Oil & Gas Co. and others completed No. 6 McElwain, SW SE SE Section 34-23-4w. It produced 209 bbls. of oil and salt water in 24 hours from Hunton lime at 3,586-94 feet, which had been acidized.

Texas Co.'s No. 1 Carmichael, C NW SW Section 10-24-4w, flowed 253 bbls. of oil and 25 bbls. of water from Chat at 3,295-3,388 feet and was completed.

Texas Co.'s No. 1 Stone, C SW NW Section 15-24-4w, was abandoned at 3,680 feet after the hole filled with water from the Hunton lime at 3,676-80 feet.

No new work was reported in the Burrton Pool.

Sedgwick County

Tom Johnson and the Atlantic Oil Producing Co.'s No. 2 Cook, 330 feet south and 884 feet west of C Section 20-28-1e, Sedgwick County, flowed a potential of 819 bbls. of oil and 2 bbls. of water from Chat at 3,095-3,114 feet and was listed as a completion.

Magnolia Petroleum Co.'s No. 8 Robbins, C NE NW SE Section 20-28-1e, pumped and flowed 549 bbls. in 24 hours from Chat at 3,090-3,105 feet, acidized, and is a completion.

Clay County

Severs and others have temporarily abandoned their test, No. 1 Meyers, NE NW NW Section 4-10-4, in Clay County, at 1,834 feet. Mississippi lime was topped at 1,775 feet.

Barber County

Sam Jarvis abandoned the location for No. 1 Morrisse, C SE NE Section 23-20-10w, Barber County.

Butler County

Western Kansas Oil & Refining Co. has rig up for No. 1 King & Marshall, NW NW SW Section 11-28-6, Butler County.

Sumner County

Shell Petroleum Co. was moving in rotary to deepen No. 2 Barnes, 220 feet north and 1,072 feet east of SW cor. Section 14-32-2e, Sumner County.

Rooks County

I. W. Murfin and others made a location for a wildcat test in Rooks County, No. 1 Wasthusin, NE NE SE Section 19-9-16w.

Woodson County

Theta Oil Co. was drilling at 650 feet in No. 6 McClaskey, CEL E half S half NE Section 31-23-14.

Kingman County

Derby Oil Co. and others were moving in material for No. 1 Bartholomew, SW SW NW Section 8-27-4w, Kingman County.

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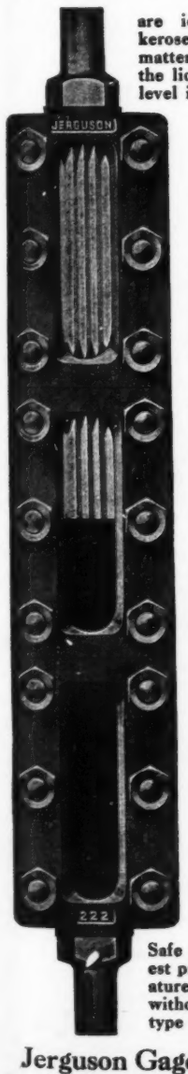

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Eight Producers Out of 10 Completions Feature Louisiana-Arkansas With More Activity

By J. R. CRUMPTON
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., May 13.—Completions in this district during the past week continued to show a high average of producers, only two dry holes out of 10 completed wells, but the initial flows of both oil and gas wells were small and to be expected from proven areas. Two wildcats in the North Louisiana district that are hot prospects at this writing should be tested during the next week.

NORTH LOUISIANA

E. B. Bird and others' No. 1 A. D. Johns, Section 20-14-16, in the northwestern part of DeSoto Parish, continues to hold the limelight as a possible producer as a result of a test of seven joints of 38 gravity oil a week ago. Six-inch casing has been set in the hole at 2,610 feet which is bottomed at 2,630 feet. The area surrounding and adjacent to the block on which the wildcat is located is getting a good play from some of the operators. A. F. Tarver, independent operator of Shreveport, has leased and bought in fee several thousand acres in the vicinity for a cash bonus with no drilling obligation. It is reported that this operator will await the outcome of further testing on the Bird well before beginning any operations. If the latter test developed the oil show as reported on drill stem test, it is evident that more holes will be drilled in that area which is near the southern Caddo Parish line.

The second interesting wildcat in this district is M. V. Duncan and others' No. 2 Hutton, Section 4-18-7, in the northwestern part of Bienville Parish near the intersection of the Webster and Claiborne Parish lines. This test is nearing the Blossom horizon, the latest report drilling at 2,626 feet. A previous test drilled 1 mile to the north developed several good shows of oil in this formation with a good body of sand but tested salt water. It is reported that the present test is checking about 35 feet higher than the first well. The last location was staked after drilling a series of core tests on the block of acreage to the base of the Cane River formation. About 15 miles south and east of the Duncan test, T. L. James and others of Ruston, La., are drilling a series of core tests on a large block of acreage, using the base of the Cane River as a marker. The block of acreage is south of the town of Bienville, and was assembled about a year ago and since that time one well has been drilled on it to the 4,000-foot level. If the core tests spot a geological high in that vicinity, another test will be drilled to a depth of 5,000 feet it is reported.

Spurt in New Locations

No other wildcats in the North Louisiana area developed anything of interest during the past week. Plain Dealing Syndicate has spudded in on another test on a large block in the northern part of Bossier Parish to determine if Blossom production is to be found in that area. The present wildcat is No. 1 L. A. King in Section 36-23-13, with 10-inch surface casing set at 58 feet and drilling at 321 feet. Sabine Parish, once the leader for several years in drilling activity in this district, but for the past six months showing a great decline, has shown a spurt in new locations during the past two weeks. More than a dozen new operations are slated to start in that parish at an early date. Laurel Petroleum Co.'s No. 1 Long-Bell Lumber Co., Section 14-8-14, a wildcat, topped the marl at 1,763 feet and the chalk at 1,791 feet where 8-inch casing was set to test chalk rock production.

The North Louisiana completion consisted of four oil wells, two gas wells and two dry holes. All of the oil producers were in the Pine Island extension of the old Caddo Field. Barnsdall Oil Co.'s No. 1 School fee, Section 16-20-15, is flowing 35 bbls. through 2-inch tubing and packer from 2,258 feet. Roy C. Golson's No. 1 Thigpen & Herold, Section 15-20-15, is flowing at the same daily rate from 2,200 feet. Murray Oil Co.'s No. 1 J. S. Noel, Section 15-20-15, is flowing 40 bbls. daily from 2,191 feet through 2-inch tubing and packer, and Press & Lambert's No. 1 Robertson, Section 15-20-15, is a 15-bbl. pumper from 2,202 feet.

The two gassers were from two parishes in the old Monroe Field. J. E. Farrell's No. 3 State of Louisiana, Section 21-20-4e, Ouachita Parish, had an estimated initial open flow of 10,000,000 feet of gas from 2,140 feet. In Union Parish, Carbons Consolidated's No. 1 Hollis, Section 10-21-3e, gauged 1,500,000 feet of dry gas with 1,020 pounds rock pressure from 2,199 feet. In the northeastern part of the state and east of the Monroe and Richland gas fields, Frazier and others' No. 1 Frazier, Section 23-17-10e, Madison Parish, had drill stem stuck and the hole was abandoned at 3,070 feet. Far removed from these operations, Williams-Carroll & Day's No. 1 Armstrong & Murphy, Section 24-5n-1w, Rapides Parish in the central part of the state, was dry and abandoned at 2,418 feet. The top of the Jackson was logged in this well at 2,189 feet with the elevation 132 feet.

ARKANSAS

There was very little change in the status of the wildcats in this district during the past week. North of Texarkana in Miller County, King Oil Corp.'s No. 1 E. G. Anderson, Section 16-14-27, was dry on drill stem test at 2,213 feet and is coring ahead. The well had previously reported shows of oil from 1,995 to 2,002 feet and from 2,088-91 feet, and 6 feet of sand around 2,212 feet. A Sevier County wildcat, Pendleton & Vaughn's No. 1 Harrison estate, Section 35-9-30, lost drill bit in the hole and is drilling by bit at 1,171 feet. The operators report coring sand showing oil at 1,185 feet, and have derrick up for a second test, No. 1 fee in the same section. Transportation Petroleum Co.'s No. 1 Red River Lumber Co., Section 26-19-25, Lafayette County, is coring at 3,350 feet, and Riggs Brothers' No. 1 J. W. DuBose, Section 35-15-24, is temporarily shut down at 2,600 feet. A new operation in that county, Larry Romaine's No. 1 Nolte, Section 11-19-26, has spudded in and set 10-inch surface casing at 80 feet.

Union County Active

Union County surrounding El Dorado, continues to be the most active spot in the Arkansas district. Earl Patterson's No. 1 C. L. Smith, Section 29-17-14, in the old East Field, was the development of most interest in that area last week. The well flowed through tubing an estimated 100 bbls. daily of 30 gravity oil from 2,902 feet, then sanded up. Five feet of oil sand was cored to the total depth. The operator has pulled tubing and is arranging to use sand pumps to clean the hole. The chief interest in the oil show in this well results from the fact that it is about 600 feet deeper than the original pay in this field. Mrs. R. K. Jones and others' No. 1 J. Davis, Section 28-16-14, which has had 7-inch casing set at 2,746 feet since January of this year, drilled plug and the hole is standing 2,000 feet in salt water with the bottom at 2,765 feet. H. L. Hunt's No. 15 E. F. Gregory, Section 10-17-14, after plugging back from the old total depth of 6,911 feet in rock salt, perforated casing from 3,428-53 feet and is blowing with air an estimated 2,500 bbls. of salt water. The Gulf Refining Co.'s No. 49 Lewis Werner, Section 5-16-16, a deep test in the Smackover Field, is drilling in hard gray sand at 5,650 feet.

The two completions in the Arkansas district were pumping oil wells. In the Stevens area of Ouachita County, L. L. McDonald's No. 1 J. A. Robertson, Section 25-15-16, is pumping 8 bbls. from 2,075 feet. The well was plugged back from a total depth of 2,601 feet. Marine Oil Co.'s No. 4-E Thompson, Section 10-18-13, Urbana Field, Union County, is pumping 150 bbls. of pipe line oil from 3 583 feet. Another new location was staked by this company in this area.

MISSISSIPPI

Seven counties in this district have active rigs, but only five of them are in wildcat territory. The Hinds and Rankin areas in the Jackson gas field show three rigs drilling. Snow Black Petroleum Co.'s No. 1 Fox, Section 30-7n-12e, Jones County, stands temporarily abandoned at 4,050 feet. In the Amory gas area of Monroe County in the north-central part of the state, P. J. McAlpine's No. 1 Crook, Section 4-13s-18w, in the immediate vicinity of the original limited gas field, is drilling in salt water sand at 2,484 feet. About 15 mles southeast of this well, the same operators' No. 1 Frank Rye, Section 15-15s-17w, is temporarily abandoned at 2,931 feet in sand. Berry Corp.'s No. 2 R. T. Berry, Section 33-2n-4e, Simpson County, which recently began drilling deeper from an abandoned depth of 2,091 feet, is shut down for fuel at 2,510 feet. A Washington County wildcat, spudded in about a year ago and shut down since that time with surface casing set at 300 feet, has been taken over by new operators. Mid-Continent Development's No. 1 Lee, formerly carried as Perkins & Dees, Section 33-15n-8w, is drilling in shale at 1,245 feet.

ALABAMA

Geometer Production Corp.'s No. 1 A. B. Culbreath, Section 8-2n-14e, Covington County, is shut down for rig repairs at 5,600 feet, and in Lamar County, DeSoto Oil & Gas Corp.'s No. 1 Gardner, Section 22-15s-16w, has resumed operations after an extended shutdown and drilling in lime at 4,200 feet.

Estimated Production

Estimated daily gross production, all companies, week ending May 10:

NORTH LOUISIANA

	Bbls.
Bellevue	690
Caddo, light	4,935
Caddo, heavy	2,150
Converse	975
Cotton Valley	450
DeSoto and Red River	1,445
Elm Grove	430
Haynesville	3,515
Holly	160
Homer	2,675
Pleasant Hill	185
Sarepta-Carterville	530
Urania	3,055
Zwolle	1,860
Total	23,055

SOUTH ARKANSAS

Champagnolle	2,420
El Dorado	2,190
Lisbon	350
Miller County	1,795
Nevada	880
Smackover, light	2,310
Smackover, heavy	18,500
Stephens	620
Urbana	2,250
Total	31,295

Wildcat Operations in Louisiana-Arkansas

(Rotary operations unless otherwise designated)

NORTH LOUISIANA

AVOYELLES PARISH

Bell Oil Co.'s No. 2 Thompson-Koltz, 450 ft. S, 350 ft. E, NW cor. Sec. 11-2n-5e.
Partly R.U. and S.D.

Southern Star Pet. Co.'s No. 1 O. G. Boyette, Sec. 28-3-5e.
S.D. for high wtr. 3,875 ft.

BIENVILLE PARISH

M. V. Duncan et al's No. 2 Hutton, 200 ft. S, 200 ft. E, NW cor. NE SW Sec. 4-18-7.
Drlg. 2,450 ft.

Saline Drlg. Co.'s No. 1 Pardee, Sec. 27-14-6.
S.D. 3,819 ft.; steel line measurement.

BOSSIER PARISH

W. A. Kirkland's No. 1 Jarrett & McKeller, 330 ft. N and W, S cor. NW NW Sec. 3-21-13.
Drlg. 1,812 ft.

Leonard Co.'s No. 1 Pearson, 250 ft. S and E of C Sec. 22-21-14.
S.D. for fuel at 2,815 ft.

Plain Dealing Synd.'s No. 1 L. A. King, 300 ft. S and E, NW cor. NE NE Sec. 36-23-13.
Set 10-in. 58 ft.; D.S. stuck at 321 ft.

Richplane Oil Co.'s No. 1-A S. H. Bollinger, Sec. 22-22-13.
Set 10-in. 40 ft.

Scott & Howard's No 1 Sherrill, Sec 13-19-12.
Partly rigged up and S.D.

R. L. Skidmore et al's No. 1 Davis, Sec. 12-18-13.
S.D. 1,150 ft.

Triangle Drlg. Co.'s No. 1-A State of La., Sec. 23-17-12, 1,000 ft. E, 2,640 ft. S, NW cor.
Coring red beds at 2,996 ft.

United Gas Pub. Serv. Co.'s No. 1-A R. V. Kerr Unit, NE cor. Sec. 24-17-12.
Drlg. lime 3,305 ft.

CADDO PARISH

Alaska Oil Corp.'s No. 1 Dickerson, 150 ft. N and E, SW cor. NW NW.
Drlg. 1,805 ft.

Nick Babare's No. 1 Gibbs, Sec. 16-20-15.
Set 6-in. 2,222 ft.; T.D. 2,240 ft.

J. Ed Bailey, tr.'s No. 1 Hartzo, NW cor. NE NW Sec. 28-22-16.
S.D. 1,236 ft.

Barnsdale Oil Corp.'s No. 1 School fee, NE cor. NW SE Sec. 16-20-15.
Comp.; flowing 35 bbls., 2,258 ft.

W. T. Bell et al's No. 1 Bostick, 1,320 ft. E, 660 ft. N SW cor. Sec. 12-22-16.
Tested S.W.; S.D.; W.O. 2,785 ft.

Cal-La. Devel. Co.'s No. 1 Glassell, NW NE Sec. 11-19-15.
Set. 10-in. 40 ft.

Roy C. Golsen's No. 1 Thigpen & Herald, 785 ft. E, 379 ft. S, NW cor. SW Sec. 15-20-15.
Comp.; flowing 35 bbls., 2,200 ft.

Hillman et al's No. 1 J. S. Noel Est., NE NE Sec. 12-20-16.
Set 10-in. 21 ft.

A. D. King, tr.'s No. 1 Roach, 641 ft. E, 375 ft. N, SW cor. SE Sec. 4-14-16.
S.D. 2,128 ft.

Murray Oil Co.'s No. 1 J. S. Noel, 298 ft. S, 200 ft. E, NW cor. SW Sec. 15-20-15.
Comp.; flowing 40 bbls., 2,191 ft.

Press & Lambert's No. 1 Robertson, 300 ft. N and E, SW cor. SE Sec. 15-20-15.
Comp.; pumping 15 bbls., 2,202 ft.

Recovery Oil Co.'s No. 1 W. L. Sibley, Sec. 15-19-14.
Arranging to set csg. 2,448 ft.

A. C. Scott et al's No. 1 Noel Est., 330 ft. S and E, NW cor. Sec. 22-20-15.
W.O.S.R. 2,261 ft.

Shreveport Oil Corp.'s No. 5-B Muslow, 150 ft. S, 1,320 ft. E, NW cor. Sec. 9-20-15.
S.D.; high wtr.; 2,167 ft.

Simplex Oil Co.'s No. 1 Keeth, 660 ft. N and E, SW cor. SE Sec. 18-20-14.
Set 10-in 80 ft.; drlg. 1,500 ft.

A. F. Tarver's No. 1 George, 330 ft. N and E, SW cor. NE NE Sec. 23-19-15.
Set 6-in. 2,443 ft.; T.D. 2,458 ft.

Texas Co.'s No. 4 School fee, Sec. 16-20-15.
Set 6-in. 2,159 ft.

Texas Co.'s No. 2 Thigpen, 300 ft. S and E, C Sec. 15-20-15.
Set 6-in. 2,182 ft.

Leonard Co.'s No. 1 Kuhn, C N½ NW SW

(Continued on Page 129)

New High Grade Oil Field Opened in Wyoming; Seventeen New Rocky Mountain Operations

By TOLBERT R. INGRAM
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., May 13.—Wyoming has a new oil field in a wildcat drilled jointly by Ohio Oil Co. and California Co. in their No. 1 Kyle, NE SE NE Section 26-21-79, on the Medicine Bow structure in Carbon County. It topped the pay in the Sundance at 5,299 feet and was still in sand at 5,391 feet. It flowed 795 bbls. through the drill stem in five hours, making 165 bbls. the last hour. The oil is very high grade testing 63 gravity at a temperature of 63 degrees. In two horizons just above the oil pay it had gas amounting to an aggregate of 62,000,000 feet a day. The structure has a closure of 2,700 feet and is approximately 12 miles long. The Ohio and California companies control 7,000 acres within the closure. Several tests have been drilled on the structure in the past but none went below the Dakota. The wildcat was spotted on a seismograph survey.

Seventeen new operations were reported under way this week in the Rocky Mountain area and a number of wells shut down for the winter are resuming. New Mexico's allowable outlet for May is increased 1,800 bbls. daily. The Tide Water Oil Co.'s No. 4 State-Foster, is the Eunice Pool, in New Mexico, was completed for 486 bbls. the first 24 hours. One new location was reported in the Jal Pool. Two completions were made in the Cooper Pool, Amerada Petroleum Corp.'s No. 1 Isbell extending the proven area half a mile north, making 152 bbls. in two hours. The Texas Co.'s No. 1-B Ogg flowed 78 bbls. an hour through the tubing. Superior Oil Co. spotted a location in the new Monument area, making two locations, one rig and one drilling well around the discovery. In the Hobbs Pool the Shell Petroleum Corp.'s No. 1 Turner was given a potential of 13,488 bbls. with 14,700,000 feet of gas. Three new locations in Hobbs were made on the eastern flank, all being outside wells. Repollo Oil Co.'s No. 1 Arnold, in the Nadine area, and the Texas Co.'s No. 1 Cole, in the Lea area, both wildcats, are shut down for orders. Eddy County had two new locations, and one well was abandoned on the Rattlesnake Dome in San Juan County.

Stanolind Oil & Gas Co.'s No. 4-8D Shaw, on the Iles Dome, in Colorado, was deepened and recompleted for 1,840 bbls. initial.

Ohio Oil Co. spotted a new location on the Byron Dome in Wyoming, and its No. 1 Kyle, on the Medicine Bow structure in Carbon County has another flow of gas estimated at 35,000,000 feet a day. The Poison Lake test of R. J. Dilger in Converse County was abandoned and the Argo Oil Co. is starting a new well in the Hamilton Dome Field in Hot Springs County. New operations in Wyoming include one each in Lance Creek, West Mule Creek, South Baxter Basin and Hidden Dome.

The Cut Bank Field in Montana had one completion and one new location. New locations include one in the Devon district and one in the Kevin-Sunburst Field.

NEW MEXICO

The allowable for New Mexico for the first half of May is 55,000 bbls. daily, which compares with 52,800 bbls. for the first half of April. The May allowable is made up of 51,500 bbls. allocated by the federal authorities, an increase of 1,800 bbls., and 3,500 bbls. allocated by the state committee to absorb shortage caused by marginal wells, an increase of 400 bbls. daily.

Allocations for the first half of May to fields outside of Lea County are as follows:

	Bbls.
Artesia	2,550
Hogback	200
Rattlesnake	750
Table Mesa	75
Aztec-Bloomfield	15
Total	3,590

Allocation to Lea County marginal units is as follows:

	Units	Allocation
Cooper	7	227
Eunice	5	460
Hobbs	1	7
Jal	20	1,302
Lea	3	185
Lea north extension	1	19
Total	37	2,200

The marginal units are allowed to produce at capacity. The nonmarginal units were given a top allowance of 146 bbls. per well daily, which compares with 150 bbls. per well per day for the first half of April. There are 335 nonmarginal units taking the top allowance, including 210 in Hobbs. Allocation by fields, including marginal and nonmarginal units, is as follows:

	Units	Allocation
Cooper	48	6,213
Eunice	57	8,052
Jal	44	4,806
Lea	11	1,353
Lea extension	1	19
Hobbs	211	30,821
Monument	1	146
Total	373	51,410
Outside Lea County	...	3,590
Total	...	55,000

Eunice Area

One completion was reported in the northern part of the Eunice Pool, an offset to producers on the east and west in Tide Water Oil Co.'s No. 4 State-Foster, C NE NE Section 8-21-36, which flowed 486 bbls. first 24 hours through the 2½-inch tubing, with 2,000,000 feet of gas, at a total depth of 3,787 feet. The pay was at 3,780-3,887 feet, the 7-inch at 3,765 feet and the 2½-inch at 3,875 feet. The elevation is 3,584 feet. It was treated with 2,000 gallons of acid.

Skelly Oil Co.'s No. 2-B State, C SW NW Section 16-21-36, is testing and flowed 73 bbls. the first hour and 50 bbls. the second hour from the pay at 3,869-3,902 feet.

The Amerada Petroleum Corp.'s No. 1 Houston, C SE NE Section 7-21-36, is shut down at 1,500 feet in salt. Atlantic Oil Producing Co.'s No. 1-E State, C NE SW Section 5-21-36, topped the brown lime at 2,710 feet and is drilling at 2,728 feet in anhydrite. Its elevation is 3,578 feet.

Continental Oil Co.'s No. 8-B-2 Meyers, C NE NW Section 8-21-36, is a near completion at 3,877 feet, total depth. It is flowing 130 bbls. per hour through the casing at 3,813 feet, with 1,872,000 feet of gas. It is running the 2½-inch tubing. The elevation is 3,587 feet. It is a joint operation with the California Co. Continental Oil Co.'s No. 18-A-2 Meyers, C NW SE Section 18-21-36, which was completed at 3,919 feet, has been connected up, but not yet gauged. Same company's No. 9-B-3 Meyers, C SE NW Section 9-21-36, set the 10¾-inch at 111 feet with 50 sacks, and is drilling at 1,415 feet in anhydrite, and its No. 20-C-5 State, C SW SW Section 20-21-36, began spudding April 25, set the 10-inch at 84 feet with 50 sacks, and is drilling at 1,240 feet in red beds. Continental's No. 30-A-2 Lockhart, C NE NE Section 30-21-36, began spudding April 23, set the 10-inch at 85 feet with 75 scaks, and is drilling at 1,225 feet in red beds, and its No. 20-C-4 State, C SE SW Section 20-21-36, had a gas show at 3,510-15 feet and has drill pipe stuck at 3,500 feet. Total depth of last named is 3,555 feet.

Humble Oil & Refining Co.'s No. 3-B State, C NW SE Section 29-21-36, is drilling at 3,095 feet in anhydrite and lime, and its No. 4-B State, C NW NE Section 29-21-36, has rig up.

Ohio Oil Co.'s No. 3 State-McDonald, C NE SW Section 16-22-36, cemented the 9⅝-inch on bottom at 1,575 feet with 400 sacks and is waiting. It topped the anhydrite at 1,450 feet.

Repollo Oil Co.'s No. 2 Adkins, SW cor. NE Section 9-21-36, began spudding April 24, set the 15½-inch at 94 feet with 80 sacks, and is drilling at 1,390 feet in anhydrite. Rowan Drilling Co.'s No. 1 Elliott, C NE SW Section 17-22-37, is drilling at 3,150 feet in lime.

Shell Petroleum Corp.'s No. 1-A State, C SE NE Section 12-21-35, is flowing by heads at the rate of 35 bbls. daily while cleaning out at 3,879 feet. It plugged back from 4,404 feet to 3,926 feet and is cleaning out bridge after shot.

Jal Area

One new location was reported in the Jal area in Gypsy Oil Co.'s No. 3 Arnott, C NW NW Section 2-25-36, an east offset to the Phillips Petroleum Co.'s No. 1 Worth. This location and two other Gypsy operations in this section are carried as being in the Jal area although they are offset locations at the south end of the Cooper Pool. They are in the heretofore undeveloped zone which separated the Cooper and Jal areas.

Amerada Petroleum Corp.'s No. 1 Dyer, C SW NE Section 31-25-37, spudded to 126 feet, in sand, and ran the 12½-inch casing.

Byrd-Frost, Inc.'s No. 1-A Wells, SE cor. NW Section 12-25-36, set the 12½-inch at 238 feet with 200 sacks, topped the anhydrite at 1,105 feet, and is drilling in salt at 1,390 feet.

Empire Gas & Fuel Co.'s No. 2 Dyer, NW cor. SE Section 31-25-37, is shut down at 402 feet for water. It began spudding April 23 and set the 12½-inch at 84 feet with 90 sacks.

Gypsy Oil Co.'s No. 1 Arnott, C NE NW Section 2-25-36, set the 13⅝-inch at 349 feet with 250 sacks and is drilling at 1,779 feet in anhydrite, and its No. 1-B Arnott, NW SW SW Section 32-25-37, began spudding April 28, set the 13⅝-inch at 282 feet with 225 sacks and is waiting at 304 feet, total depth. Same company's No. 2 Arnott, C NW NE Section 2-25-36, began spudding April 29 and is drilling at 290 feet in red beds.

Hammond, Inc.'s No. 2-B Sholes, NE cor. NW Section 13-25-36, is bottomed at 3,258 feet and cemented the 5½-inch at 3,248 feet with 265 sacks. A drill stem test at 3,186-3,287 feet showed 4,000,000 feet of gas a day. R. H. Henderson and others' No. 1 Langley, C SE SE Section 8-25-37, is shut down for orders at 2,875 feet with two strings of cable tools and whipstock in the hole.

Jeffers Oil Co.'s No. 1 Carlson, C NW SE Section 27-25-37, is spudding with machine at 40 feet.

Tide Water Oil Co.'s No. 1 Coats, SE cor. NW Section 31-25-37, is rigging up rotary.

Cooper Area

Two completions were reported in the Cooper Pool. One of these, the Amerada Petroleum Corp.'s No. 1 Isbell, C SE NE Section 15-24-36, extends the productive area half a mile to the north, the nearest well being Continental Oil Co.'s No. 15-

New Turner Valley Field Drilling Record Established by Royalite No. 26 Well

By VICTOR LAURISTON
Staff Correspondent, Canadian Fields

CHATHAM, Ontario, May 11.—In the North Turner Valley Field, Royalite Oil Co.'s No. 26, LSD 5, Section 23-20-3w5, is making around 250 bbls. a day naphtha recovery from the Madison lime at 5,083 feet, with 1,000 pounds back pressure. Owing apparently to the drilling fluid in the hole, early naphtha recovery was somewhat discolored, but is gradually becoming clearer. Royalite's No. 26, which logged high in comparison with other North Turner Valley producers, got the lime at 4,893 feet and production only 170 feet in the Madison. It is about 800 feet southeast of Model Oils' No. 1 in LSD 8, Section 22-20-3w5, which has been producing high grade crude with only a small accompanying gas flow from the lime at 5,905 feet. It got the Madison at 5,800 feet. Royalite's No. 26 is 917 feet higher. The initial wet gas flow in the Royalite well was one of the largest encountered in Turner Valley, between 25,000,000 and 30,000,000 feet a day. The well was completed in 120 days, establishing a new drilling record. Hilary Head was in charge.

Royalite Oil Co. controls the entire Section 23-20-3w5, the location being on the western edge, offsetting Model's No. 1 producer on the eastern edge of Section 22. Model Oils, Ltd., holds the intervening acreage up to the line of Section 23, and may drill a closer offset. South and east of Section 23-20-3w5, Richfield Petroleums' No. 2, LSD 12, Section 13-20-3w5, a small producer in the lime, is to be deepened. Most of the acreage close to Royalite's No. 26 is tied up, but work may be started on some leases north of Sections 22 and 23.

South Turner Valley

In Section 28-18-2w5, South Turner Valley, Publix Oil & Gas Co.'s No. 1, LSD 8, is being shot with 1,200 quarts, the largest shot ever fired in Canada. Publix No. 1 got the lime at 4,910 feet and finished at 5,524 feet with a small production from a tightly packed sand. It finished in black lime but has been plugged back to about 5,500 feet, the shot being spread over various porous horizons to within 85 feet of the top of the lime. In the same section, Renfrew Royalties' No. 1 Morris & Goodfellow, LSD 3, is deepening from 4,800 feet. There is a lot of light crude from the upper horizons but it will be carried to the lime. British Dominion Oil & Development Corp.'s No. 4, LSD 6, same sec-

(Continued on Page 122)

A-1 Vaughn. No. 1 Isbell also is 1½ miles to the south of Humble Oil & Refining Co.'s No. 1 Coats, which has been out of control for several months. It was completed at 3,554 feet and flowed 152 bbls. in two hours through the 2½-inch tubing on a 1-inch choke, with 1,000,000 feet of gas. The 7-inch is at 3,530 feet and the tubing at 3,551 feet. The elevation is 3,379 feet.

The other completion is the Texas Co.'s No. 1-B Ogg, C SE SE Section 34-24-36, at the southern edge of the developed area, a north offset to Phillips Petroleum Co.'s No. 1 Worth, It was drilled to 3,513 feet and flowed an average of 78 bbls. an hour for four hours through the 2-inch at 3,507 feet, with 1,000,000 feet of gas. The pay was at 3,510-12 feet and the elevation is 3,279 feet.

Humble Oil & Refining Co.'s No. 1 Thomas, C SW SE Section 23-24-36, on the east side of the pool, which was completed last November as a 7,500,000-foot gas well after plugging back from 3,602 to 3,450 feet, is now listed as an oil well. Last week it was reported making 1 bbl. an hour. This week it was given an allowable outlet of 155 bbls. daily. It will be reconditioned. The hole is open below the 9⅝-inch at 2,763 feet.

Amos G. Carter and others' No. 1 Mattix, C SE NW Section 3-24-37, set the 8¼-inch at 1,294 feet with 200 sacks and is drilling at 1,510 feet in anhydrite.

Continental Oil Co.'s No. 23-A-2 Gates, C NW NW Section 23-24-36, has rig up and its No. 26-A-1 Gates, C SW SW Section 26-24-36, topped the anhydrite at 1,257 feet and is drilling in salt at 1,351 feet.

Empire Gas & Fuel Co.'s No. 4 Everett, C SW SW Section 35-24-36, is standing with cellar and pits completed.

General Crude Oil Co.'s No. 1 Woolworth, C NW SE Section 26-24-36, topped the brown lime at 2,756 feet and is drilling at 3,056 feet in lime.

Humble Oil & Refining Co.'s No. 1 Coats, C NW NE Section 10-24-36, which was attempting to run the 3-inch in an effort to kill the well, could not get the pipe on bottom and pulled the string. It probably will run the 7-inch.

Simms Oil Co.'s No. 1 Woolworth, C SE NE Section 35-24-36, is drilling at 2,160 feet in anhydrite after plugging back from 3,406 feet to 1,440 feet.

The Texas Co.'s No. 2-B Ogg, C SE NE Section 34-24-36, is drilling at 3,382 feet in lime, and its No. 3-B Ogg, C NE NE Section 34-24-36, began spudding April 25, set the 12½-inch at 154 feet with 175 sacks, and is drilling at 806 feet in red beds.

Patterson-Ballagh Protectors used in drilling World's deepest well in McElroy (Texas) Field

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Monument Area

Another location in the new Monument Pool was spotted this week in the Superior Oil Co.'s No. 1 State, C NE NE Section 2-20-36, a west offset to the Amerada Petroleum Corp.'s No. 1-D State, the discovery well. The Amerada company's No. 1-F State, C SW SW Section 36-19-36, a north offset to the discovery, is drilling at 3,418 feet in lime. It had gas shows at 2,753, 2,957, 3,143 feet. No gauges were taken. Shell Petroleum Corp.'s No. 1-E State, C SE SE Section 35-19-36, is still a location, and the Texas Co.'s No. 1 Saunders, C SE SW Section 18-19-37, is moving in materials.

Hobbs Area

One completion and three new locations were reported in the Hobbs Pool.

Shell Petroleum Co.'s No. 1 Turner, SW cor. NE Section 34-18-38, just north of the Hobbs Townsite on the eastern side of the pool, was listed as a completion. The pay was at 4,165-4,220 feet, the latter being the total depth, and it was given a potential of 13,488 bbls. daily with 14,700,000 feet of gas, after treating with 2,000 and 6,000 gallons of acid.

The three locations are all in that part of the field and are all outside wells. Stanolind Oil & Gas Co.'s No. 26 Byers, C SE NE Section 3-19-38, half a mile out from the nearest producer, is rigging up rotary. J. P. Cusack, Inc.'s No. 1 Byers, 660 feet south of north line and 2,310 feet west of east line, NE Section 3-19-38, between the New Hobbs and Hobbs Townsites, is spudding at 135 feet in sand. It is a farm-out from the Continental Oil Co. The other location is the Shell Petroleum Corp.'s No. 3 Sanger, SW NW SW Section 27-18-38, for which cellar and pits have been completed.

Capitan Oil Co.'s No. 2 Turner, SW SE Section 34-18-38, is waiting at 4,075 feet, total depth, after cementing the 7-inch at 4,006 feet with 500 sacks. Cusack, Inc.'s No. 2 Moon, SW SE NE Section 28-18-38, is drilling at 2,085 feet in salt, and Continental Oil Co.'s No. 3 Grimes, SW NW SE Section 28-18-38, had an oil show at 4,115-26 feet and is drilling in lime at the last named depth. Gypsy Oil Co.'s No. 4 Graham-State, C NW NE Section 24-18-37, cemented the 9⅝-inch at 1,574 feet with 400 sacks and is drilling at 3,032 feet in anhydrite. The National Securities Oil Co.'s No. 1 Linam, NE SE SW Section 33-18-37, plugged back to 4,244 feet and is preparing to acidize. Old total depth was 4,506 feet.

Nadine Area

Repollo Oil Co.'s No. 1 Arnold, SW NW SE Section 11-20-38, 6 miles south of the Hobbs Pool, is shut down for orders at 4,343 feet in lime. A drill stem test at 4,167-4,305 feet showed 195 feet of mud and a little oil in half an hour. Another at 4,240-4,343 feet showed 10 feet of mud and a show of oil in half an hour.

Lea Area

The Texas Co.'s No. 1 Cole, C NE NE Section 35-19-33, a wildcat on the northwest trend from the Lea Pool, is a disappointment at 3,518 feet, total depth, and is shut down for orders. At that depth it had 2,590 feet of salt water in the hole. The 6⅝-inch at 3,473 feet shut off 2,500 feet of sulphur water at 3,393-3,400 feet.

Jeffers Oil Co.'s No. 1 Jiminez, C SW SE Section 12-30-33, is drilling at 175 feet in red beds, and same company's No. 1 Etz, C NE SW Section 12-21-32, is drilling at 185 feet in red beds. Anderson & Pritchard's No. 1 Fisher, C SE NE Section 8-20-35, is bottomed in salt at 2,005 feet and straightreaming.

Maljamar Area

The Maljamar Oil & Gas Co.'s No. 1 Miller, C NW SW Section 23-17-32, is waiting at 3,595 feet, total depth, after cementing the 6⅝-inch at 3,575 feet with 75 sacks.

Eddy County

Two new operations were reported in Eddy County. Dooley & Shank's No. 1 McClay, C NE SE Section 33-18-30, is a location for a wildcat south of the Jackson Pool, and R. G. Pattillo's No. 1 Thomason, SE cor. NE Section 12-20-28, is spudding in sand at 50 feet in the Getty area.

Getty Oil Co.'s No. 7 Dooley, SW cor. NW Section 24-20-29, Getty Pool, set the 9⅝-inch at 3,739 feet with 125 sacks and is drilling in lime at 3,825 feet. The Barnsdall Oil Corp.'s No. 2 Dodd, C NE SE Section 22-17-29, Jackson district, is drilling at 1,725 feet in anhydrite. The Permier Petroleum Corp.'s No. 1-E Dexter, C NW NE Section 20-17-30, Maljamar area, is bottomed at 2,810 feet in lime and waiting after cementing the 8¼-inch at 1,096 feet with 30 sacks. Stovall & Marshall's No. 2 Rose, C NE SW Section 28-24-27, Pecos River district, is drilling at 2,120 feet in anhydrite.

Otero County

Flynn, Welch & Yates' No. 1 Donahue, C NW NE Section 28-24-15, is drilling at 700 feet in lime and shale.

Union County

Sierra Grande Oil Corp.'s No. 1 Rogers, C NE SW Section 4-29-29, Sierra Grande arch, is drilling in dry sand at 1,470 feet and had a good show of wet gas at 1,225 feet in the red beds.

Guadalupe County

Anton Chico Development Co., Ltd., No. 2 fee, NW NE SW Section 20-9n-17, Anton Chico grant, is drilling at 810 feet and making slow progress due to frequent loss of circulation in cavernous ground.

San Miguel County

Cabra Springs Oil & Gas Co.'s No. 1 Thompson, SW NE NE Section 22-12-22, Pino Mesa, has underreamed and lowered the 6⅝-inch to bottom at 3,865 feet and will carry it.

Valencia County

Continental Oil Co. is reported calling for bids for moving seven carloads of rotary equipment from Albuquerque to location for a test on the 60,000-acre Evans ranch in Sandoval and Valencia Counties. A lease on the property was acquired last fall and considerable geological work has been done since then.

Western Natural Resources Corp.'s No. 2 fee, SE cor. NW Section 5-6n-1e, San Clement grant, has been unable to loosen the 6⅝-inch which stuck while lowering to bottom at 6,001 feet. It may shoot off and try to sidetrack, or skid rig and start new hole.

Bernalillo County

Norins Realty Co., Inc.'s No. 1, Pajarito grant, NW cor. NE Section 29-9n-1e, near Albuquerque, which had trouble getting through hard formation at 386 feet, total depth, skidded rig over well drilled for water and is drilling at 370 feet in new hole.

San Juan County

Kutz Canon Oil & Gas Co.'s No. 1 Day, SW cor. Section 20-28-10, Kutz Canon district, which had several million feet of wet gas in the Picture Cliff formation topped at 2,012 feet, is again attracting attention as it draws near the objective Point Lookout sand. It is drilling at 4,340 feet and going through thin layers of shale and sand showing some gas and enough oil to bail samples. The upper gas was saved between casings and is being used for camp purposes. The new gas began showing at 4,325 feet. Drillers say they are not yet in the Point Lookout, but progress is slow due to small size of bit. The 4¾-inch is being carried at around 3,500 feet and the hole below that point is open.

Continental Oil Co.'s No. 43, NW SE NW Section 12-29-19, Rattlesnake Field, is plugging to abandon at 1,020 feet, total depth.

McKinley County

The Farmington Times-Hustler reports that Bennett & Lingfelter's No. 1 Lark Drilling Co., NW NW Section 29-20-9w, Red Mountain district, has a show for a 20-bbl. well at around 500 feet. The well

began spudding two weeks ago. The location is 6 miles east of a test drilled in 1926-27 by the Pittsburgh Oil Development Co. in Section 30-20-10w to 3,275 feet and abandoned, on the Bonita (Cathedral Rocks) anticline.

COLORADO

Moffat County

Stanolind Oil & Gas Co.'s No. 4-SD Shaw, NE NW NE Section 27-4n-92, Iles Dome, an old well drilled deeper from 3,426 feet, was recompleted at 3,464 feet in the Sundance and made 77 bbls. an hour, or at the rate of 1,840 bbls. a day. Old well was completed in 1928 3 feet in the Sundance for 300 bbls. a day initial. Same company's No. 16-SD Shaw, SE NW NW Section 27-4n-92, is rigging up rotary to go to the Sundance.

Archuleta County

The Oil City Petroleum Co.'s No. 1-A Garnett, NW NE SW Section 25-33n-2e, Price district, which has been standing for several months with oil in the hole, is expected to resume about May 15. C. B. Garnett went to the well several weeks ago with crew to resume, but the roads had not dried up sufficiently to move in equipment necessary to make a test. He said the oil was standing 450 feet in the hole at a total depth of 1,098 feet.

Boulder County

Leslie R. Steele and others' No. 1 Maxwell, SW NE NW Section 24-1n-71, Boulder district, is drilling at 708 feet.

Jackson County

Continental Oil Co.'s No. 3 Hoye, NW cor. NE Section 34-9n-78, South McCallum Dome, which was drilled to 2,297 feet last fall and shut down for the winter after plugging back to 2,080 feet, is rigging up to resume and cleaning out.

Park County

South Park Oil Co.'s No. 1 State, SE cor. SW Section 16-11-75, Hartsel district, is underreaming at 1,250 feet to lower the 10-inch to bottom at 1,415 feet.

Prowers County

Trojan Oil & Gas Co.'s No. 1 Lotus Oil, NW NE NE Section 15-23-46, Lamar district, is shut down at 5,224 feet waiting for new drilling line ordered from New Jersey, and due to arrive today. Hole below the 6¼-inch at 3,942 feet is reported making about 3 bailers of water and half a barrel of oil daily. The water is decreasing. Tools are on bottom with part of drilling line and it was decided not to take any unnecessary chances on losing this important test and fishing will not be resumed until new line is installed.

WYOMING

Albany County

The California Co.'s No. 1 Holst, NE SE SE Section 13-17-77, Quely Dome, discovery well on this structure, is bottomed at 3,256 feet and rigging up for a pumping test from the Dakota topped at 3,231 feet. The well flowed 150 bbls. a day natural and swabbed at the rate of 25 bbls. an hour in preliminary tests. Last fall it made 60 bbls. a day initial on the pump from the Muddy and after filling tankage shut down until spring to drill deeper.

Big Horn County

Peay Oil Co.'s No. 1 Denio Milling Co., Tract 43-C, Section 15-55-97, is a fault block south of the Garland Dome, which filled a 250-bbl. tank in 16 hours from the Torchlight sand at 3,225-26 feet, was listed a completion this week with an initial production of 115 bbls. natural in 24 hours. The oil tests 50 gravity.

A new location in the Byron district was released in the Ohio Oil Co.'s No. 3 Byron-Union, NW NE Section 22-56-97. This company's No. 2 Sidon Canal, C SW SW Section 24-56-97, is drilling at 2,332 feet, and its No. 1 Till, C SE SW Section 24-56-97, is rigging up rotary.

Yale Oil Corp.'s No. 1 Blakesley, NE NW Section 28-49-91, Bonanza district, is bottomed at 1,425 feet and underreaming the 8¼-inch from 1,395 feet to bottom to shut off some upper water and continue to the Mowry.

California Exploration Co.'s No. 1 Gafner, C SW SW Section 4-54-94, Spence district, plugged back from 1,500 feet to 1,040 feet and is plugging back again to 950 feet to test show at 750-950 feet.

Carbon County

Ohio Oil Co.'s No. 1 Kyle, NE SE NE Section 26-21-79, Medicine Bow district, is coring at 5,315 feet in the second bench of the Sundance and showing for approximately 35,000,000 feet of gas a day. There was a shale break at 5,230-72 feet. The first Sundance, or Morrison, showed for 36,000,000 feet a day in a drill stem test. There is some question as to whether the gas is in the Morrison or Sundance formation. It is a joint operation with the California Co. The plan is to continue to the top of the red beds.

The Ohio Oil Co.'s No. 10 Harrison & Cooper, NE NW SW Section 35-20-78, Rock Creek Field, an old well drilling deeper to test the Sundance, is drilling at 3,099 feet in the Morrison and had a show of oil in that formation at 3,064 feet.

Converse County

R. J. Dilger's No. 1 Government, SE NE SW Section 33-31-72, Poison Lake district, was reported plugged and abandoned. Total depth was below 1,100 feet. Chadron-Osage Oil Co.'s No. 1 State, SW cor. Section 16-32-69, Shawnee district, is drilling below 500 feet.

Fremont County

Mid-American Oil Co.'s No. 2 Government, C NE SW Section 14-28-92, Sheep Creek, is reported to have pumped 40 bbls. of oil and 200 bbls. of water in 24 hours from the Embar at 2,262 feet, total depth, after acidizing. Water is believed to be coming from behind the casing and the 6⅝-inch is being recemented at 2,175 feet.

Hot Springs County

A new operation in the Hamilton Dome Field is the Argo Oil Co.'s No. 16 Ellen, NE SE NW Section 14-44-98, which is moving in materials.

Niobrara County

Black Hills Refining Co., recently organized under the laws of California, is reported to have closed a deal for a Sundance test on the Wright permit in the SE SW Section 22-36-64, east end of the Lance Creek anticline. This location is about a mile northeast of an isolated producer in Section 28, several miles from the developed area of the field. The new company has assembled a block of 7,700 acres and expects to begin drilling in 60 days.

Ohio Oil Co.'s No. 6 Lamb, SE SE Section 32-36-65, is drilling at 3,468 feet. Continental Oil Co.'s No. 1 Apex-3, SW NE SW Section 34-36-65, which lost the bailer below a bridge at 3,533 feet, total depth, has cemented back to 3,444 feet. Argo Oil Co.'s No. 3 Elliott, C NE NE Section 6-35-65, set the 12½-inch at 156 feet.

A new operation in the West Mule Creek Field is the Fall River Royalty & Producers Co.'s No. 3-L Governmest, E NE NE Section 2-39-61, which is spudding at 50 feet.

Park County

Continental Oil Co.'s No. 3 Northern Pacific, NW SE SE Section 23-58-98, Frannie Field, is digging cellar and pits. Location was released last February. The Texas Co.'s No. 3 Sonners, E NE NW Section 29-51-100, Oregon Basin Field, is drilling at 3,048 feet. George T. Beck's No. 1 fee, NW SE NW Section 27-53-101, Cody (Shoshone) district, is resuming at 1,181 feet after being shut down for the winter.

Sublet County

The California Petroleum Corp.'s No. 4-K, SW SE SW Section 34-27-113, La Barge Field, is drilling at 595 feet.

Sweetwater County

The Mountain Fuel Supply Co.'s No. 1 Joseph Brooks, C NW NE Section 15-16-104, South Baxter Basin, is a location. This is reported to be the only operation in that field by this compasy in prospect at the present time.

Washakie County

An operation not heretofore reported is C. L. Brome and others' No. 3 Government, SW NW NW Section 31-48-90, Hidden Dome, drilling at 530 feet.

Weston County

A first report in the Osage Field is Dilger & Son's No. 1 Thierry, NW NW SW Section 32-46-63, which is rigging up. The Osage Trust Co.'s No. 15-A, NW cor. SE Section 14-46-64, is waiting after cementing the 8¼-inch. La Fleishe Oil Co.'s No. 18 fee, C SW SW Section 17-46-63, is resuming at 360 feet after being shut down for the winter.

MONTANA

Glacier County

One completion and one new location were reported in the Cut Bank Field.

Bruce Radigan's No. 1 Connolly, NW SW NW Section 7-33-5w, near the town of Cut Bank, will make a small pumper at 2,967 feet, total depth. The pay was

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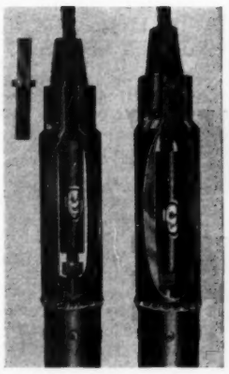

Left: Illustration of Tool Pin Bail, shown with wire line and swivel ready for lock to be inserted holding wire line to bail. *Right:* Illustration of bail with wire line and swivel inserted in bail ready to run on socket. This type bail eliminates the necessity of using both a sand and drilling line, as the same swivel is used in socket with tools and connected to the eye bolt and plunger when the sand pump is run.

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cut at 2,940-53 feet and oil rose 500 feet in the hole.

The new operation is the Texas Co.'s No. 2 Mabel Morrison M-357, Lot 7, Section 22-35-6w, which is moving in rotary tools.

Askins' No. 1 Askins, Lot 24, Block 12, Section 12-33-6w, has recovered 16 joints of dropped casing.

Consolidated Gas Co.'s No. 5 Tribal, Lot 5, Section 3-34-6w, topped the Colorado at 575 feet and cemented the 10-inch at 606 feet with 50 sacks, and its No. 6 Tribal, C SW SW Section 10-34-6w, is drilling at 1,060 feet.

Dakota-Montana Oil Co.'s No. 2 Winkler, E NE NW Section 26-35-6w, is drilling at 1,800 feet, corrected depth.

Gardner-Smith's No. 1 Tweedy, NE NE Section 36-33-6w, is drilling at 1,300 feet.

L. R. Hannah, trustee's No. 1 State, Lot 5, Block 4, Section 12-33-6w, topped the Colorado at 545 feet and cemented the 10-inch at 594 feet with 50 sacks.

The Indian Oil Co.'s No. 2 Winkler, W SW SW Section 23-35-6w, is drilling at 1,650 feet.

Kately-Drumheller's No. 2 Ward, SE NE Section 10-34-6w, is drilling at 160 feet.

Montana Headlight Oil Co.'s No. 5 Yunck, NW NE NW Section 1-34-6w, is drilling at 2,625 feet. Montana Power Gas Co.'s No. 1 Bonnett, C SE NW Section 4-32-5w, has rig on location, and its No. 1 Highland Unit, NW SE NW Section 27-36-5w, is drilling at 1,200 feet. Same company's No. 1 Lookhoff, C SW SE Section 28-33-5w, topped the Colorado at 675 feet and set the 10-inch at 704 feet with 50 sacks, and its No. 1 Miller, C NW NW Section 28-33-5w, is drilling at 1,565 feet.

Nadeau Brothers' No. 2 Coover, C NE NE Section 17-33-5w, has rig on location, and their No. 4 Van de Mar, C SW NE Section 35-35-6w, is spudding at 200 feet.

Par Oil Co.'s No. 4 Haines, E SE SE Section 2-34-6w, is drilling at 2,665 feet.

Santa Rita Oil & Gas Co.'s No. 1 McCabe, C NW SW Section 28-33-5w, has materials on the ground, and its No. 1 Government, C NE SW Section 4-32-5w, has rig on location. Same company's No. 1 Ritchie, C NW SW Section 5-33-5w, is drilling at 1,775 feet, and its No. 2 Ritchie, C NE NE Section 6-33-5w, is spudding at 430 feet. Santa Rita's No. 5 Whetstone, NE SE Section 22-35-6w, is drilling at 930 feet. The Steele Creek Producers, Inc.'s No. 2 Carman, C SW NW Section 19-34-5w, topped the Colorado at 440-445 feet and set the 10-inch at 475 feet with 50 sacks.

R. C. Tarrant's No. 6 Haglund, Jr., C SE NW Section 13-34-6w, has rig on location. The Texas Co.'s No. 3 Schlag, SW SE SE Section 26-35-6w, set the 7-inch on bottom at 2,775 feet with 60 sacks and is moving in spudder to drill in. Same company's No. 1 Sherburne Mercantile Co., C NW SW Section 10-34-6w, is drilling at 2,149 feet.

★ ★

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Big Horn County

Daniels Petroleum Co. has been organized by Hardin citizens to drill a deep test for oil in the town limits and is engaged in financing. Several shallow wells drilled to 400 to 600 feet are supplying residents with natural gas. No deep test has been drilled.

Carbon County

Ohio Oil Co.'s No. 15 Montana Industrial, C NE NE Section 11-7s-21, Dry Creek, is drilling at 1,000 feet.

Fergus County

Button Butte Oil & Gas Co.'s No. 1 Woodward, SE cor. SW Section 20-14-24, Button Butte district, is drilling at 3,030 feet, corrected depth.

Liberty County

J. H. Hamilton and others' No. 1 Northern Farms, C NE SW Section 10-37-5e, Flat Coulee, has recovered lost bailer and is drilling ahead at 2,560 feet.

Phillips County

Guy Norman's No. 1 Pewitt, NE NW NE Section 20-24-24, Guinn district, is drilling at 560 feet, and Grant Smith and others' No. 4 Phillips, NW SW Section 2-24-23, Bull Creek, is drilling at 230 feet.

Rosebud County

Birney Oil & Gas Co.'s No. 1, SW cor. Section 7-6s-43, Birney district, has resumed and is drilling at 235 feet.

Toole County

A first report in the Devon district is Fraser & Kluth's No. 1 Severance, C SE NE Section 29-32-2e, which has rig on location.

One new location in the Kevin-Sunburst Field is C. T. Oien's No. 1 Engerman, SW cor. NW Section 14-35-2w.

Monopeg Oils, Ltd., No. 3 Dipple, SW NW Section 28-35-1w, is fishing for two strings of tools at 1,440 feet. A. E. Crumley's No. 5 Shaw, NW SE SW Section 35-36-2w, is drilling at 910 feet, and the Mon-Tex Petroleum Co.'s No. 1, SE NW Section 27-34-1e, has rig on location. The Texas Co.'s No. 5 Swears, C SW Section 9-35-2w, is standing at 1,570 feet after acidizing.

UTAH

Arrowhead Petroleum Co.'s No. 2 Escalante, NW cor. NE Section 19-43-15, Bloomington district, has completed electrically equipped standard rig and is ready to resume drilling at 4,114 feet, but is waiting until all claims resulting from the explosion in March in which 10 persons were killed are settled. Same company's No. 1-A, SE SW NE Section 1-43-15, Punchbowl district, is drilling at 950 feet.

Drilling crew on the Ramsey Petroleum Corp.'s No. 1 Weightman, NE SW Section 18-26-7e, Last Chance structure, is expected to return from Oklahoma shortly and resume operations. This well gauged 21,000,000 feet a day. It showed for a larger volume before pipe was set and it is planned to shoot off that part which cased off part of the sand in an effort to bring back the maximum flow. A deep well will then be drilled near this location to test horizons below the big gas for oil, the present hole being too small to reach the lower Pennsylvanian and Mississippian. Program also calls for a flank well to test the oil possibilities of the horizon in the lower Triassic which yielded 4,000,000 feet a day at 2,530-96 feet. Gas in the discovery well will be saved as a part of the supply for the development of the alunite deposits at Marysville, a project of the Bohn Aluminum Corp. and the Ford Motor Co.

Canadian Fields

(Continued from Page 119)

tion, is at 5,350 feet and working on casing. In the far south end, Union-Freehold Oil Corp.'s No. 1, LSD 8, Section 21-18-2w5, is in the lime at 5,610 feet and fishing.

Hargal Sells Acreage

Shareholders of Hargal Oils, Ltd., at their annual meeting at Vancouver approved sale of their production and interests in Section 20-19-2w5, South Turner Valley, to Royalite Oil Co. for 1,000 shares of Royalite stock, representing a market value of approximately $21,750. The deal includes the east halves of LSD's 10 and 15, Section 20, with Hargal's No. 1 and production equipment. The well, completed some years ago, has been a small producer, making 69 bbls. in March. The Hargal company also owned a small producer in the Wainwright Field, not included in the deal.

Shareholders of Spooner Oils, Ltd., will consider a proposal to sell their acreage and production in the North Central Turner Valley area to Royalite Oil Co. this month. The consideration is 8,300 shares of Royalite stock.

Jumping Pound Prospect

The Alberta government has thrown open for auction leases on a considerable area in the Jumping Pound district south and west of Calgary. Some acreage is in Sections 30 and 32, Township 24-4w5, west and east of Imperial Oil's No. 1 location in LSD 11, Section 31-24-4w5. The Jumping Pound area was included in the original western development campaign of Imperial Oil, Ltd., with two tests betwen 1927 and 1929. Imperial's No. 1 Bow River, LSD 15, Section 12-25-5w5, got gas at 3,568 feet and finished in the Benton at 5,330 feet. Imperial's No. 2 Bow River, farther east, in LSD 11, Section 31-24-4w5, got gas in 10 different horizons between 450 and 2,896 feet and oil shows in the Blairmore formation at 705 and 1,068 feet. The log of No. 2 indicates marked faulting, getting the Blairmore at 420 feet, passing back into the Benton at 720 feet, with the Blairmore recurring at 770 feet. It got the Home sand at 2,716 feet, the Dalhousie at 3,174 feet, and the Kootenay at 3,200 feet, going back to the Belly River, normally overlying the Benton, at 3,255 feet. Work was suspended at 3,530 feet; the well is still producing some gas. Several tests had previously been started by other interests but none to any great depth. Purity Oils' No. 1, LSD 9, Section 34-25-5w5, got oil and gas shows in 1,225 feet. Imperial Oil, Ltd., is understood to be holding its acreage.

British Columbia Test

In the Sage Creek area in southeastern British Columbia, Columbia Oils' No. 1 is below 3,130 feet. Dark crude was met at 3,119 feet and the drill is still in the sand, which also shows some gas. The crude is a paraffin base product and there is sufficient pressure to shoot the oil at intervals a distance of 50 feet from the flow pipe. An oil show was previously encountered at 1,900 feet and gas between 1,900 and 1,940 feet, with a further gas show at 2,393 feet.

Saskatchewan Drilling

In the Lloydminster gas field, western Saskatchewan, Colony Oil & Gas Co.'s No. 1, Section 25-49-27w3, is spudding, starting with 15½-inch hole. J. B. Messender, general manager, is in charge.

In the Hudson Bay Junction area of northern Saskatchewan, a drilling crew is preparing for resumption of Trail Blazer Oil & Gas Co.'s No. 1, SW Section 32-44-3w2, standing since last fall at 610 feet, some 20 feet in an oil sand showing a black paraffin base crude. A carload of equipment and casing has been shipped from Calgary, and another carload to Kakwa, where Amalgamated Gas & Oil Co. has encountered gas at 275 feet in two out of three shallow tests. A drilling crew is being brought from Sar-

(Continued on Page 136)

TECHNICAL QUESTIONS ANSWERED

By Charles K. Francis, Ph. D., Technical Editor

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to sumbit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible.

Inquiries must be signed but only the given initials will be printed. The source of the question is considered to be confidential.

Questions requiring a discussion of patents, the use of intricate formulas, extended computations, or cost estimates cannot be considered.

When the matter is of general interest the reply will be published within a reasonable time.

Salt Content of Crude Oil Seldom Regulated by Pipe Lines

Will you please give me the maximum amount of salt in grains per gallon allowed by pipe line companies that they will accept for transfer?—D. M. P.

The pipe lines do not transport oil containing more than 1 per cent sediment and water, some companies do not handle oil containing over 0.5 per cent sediment, others stipulate that the oil shall not contain over 0.3 per cent free water.

There does not appear to be any effort by the pipe lines to enforce a specification covering salt but some refineries do limit the salt content of the crude oil purchased to so little as 5 pounds per 1,000 bbls., others permit a maximum of 30 pounds per 1,000 bbls. of oil.

A moisture-free oil cannot contain salt, so the water limitation of say 0.3 per cent will also control salt. Oil field waters may contain a total of about 30 per cent salt, as calculated from the total chlorides, so if the water is saturated with salt the maximum of 0.3 per cent free water would be equivalent to a maximum salt content of approximately 0.09 per cent, which means a much more liberal allowance than that required by some refiners.

The standard method for stating water analyses is parts per 1,000,000, which may easily be converted to parts per 100, or per cent, by proper movement of the decimal point. One part per 1,000,000 is equivalent to 0.0584 grain per gallon. One pound is 7,000 grains, and a gallon of water weighs 58,402 grains.

Original Thermometer Invented by Galileo Called Thermoscope

Can you tell me who was the inventor of the thermometer, or the first instrument, whatever it may have been designated, for the measurement of temperatures?—J. H. G.

The invention of the thermometer is credited to Galileo, who about 1593 made an air thermometer. This instrument consisted of a bulb with a long glass tube attached, which was provided with a scale, and dipped below the surface of a suitable liquid, such as wine or water. After some of the air was expelled from the bulb the liquid rose in the tube to rise or fall with increase or decrease in temperature. The thermoscope was used by Galileo for various purposes, including the studies of freezing mixtures and for indicating atmospheric temperatures. It is reported to have been used in 1611 by Sanctorius in the diagnosis of fevers.

The world "thermoscope" was used by Bianconi in 1617, and "thermometer" in 1624 by Leurechon. The first thermometers with graduated scales were those of Ferdinand II, Grand Duke of Tuscany, who, in 1641, made use of alcohol as the actuating liquid. In 1661 Fabri arranged a scale with the temperature extremes those of snow and midsummer heat. Robert Hooke proposed in 1664 the freezing point of water as one of the fixed temperatures; also, in 1694, Renaldini suggested the freezing point of water as one and the boiling point of water as the other extreme.

In 1709 Fahrenheit introduced his alcohol thermometer, to be followed in 1714 with the instrument containing mercury. About 1730 Reaumur devised his scale on which 0 indicated the freezing point of water and 80 the boiling point, which was in use for many years in Europe. In 1742 Celsius proposed a Centigrade scale, with the temperature of melting ice designated at 100° and the boiling point of water at 0°. Christin, working independently of Celsius, suggested a Centigrade scale in 1743 which is the Celsius scale inverted. This is the one now used. The Fahrenheit scale is 32° for the freezing point of water and 212° for the boiling point.

A complete history of the early thermometers is given by H. C. Bolton in the Evolution of the Thermometer.

Voltol Process for Making High Viscosity Lubricating Oil

We would like to know the origin, with the name of the manufacturing company, of what is known as Voltol, (Volt Oil), a lubricating oil with a low freezing point.—A. B. C.

The Voltol process appears to have originated in German patent to Hemptinne and Alexander, No. 234, 543, class 23, C-1, 1909. The company owning the patents and operating the plant at Potschapple, Germany, is the Deutsche Voltewerke, A.G. The essential claim for the process is raising the viscosity of oil by the glow-discharge of relatively high frequency electricity. It has been explained that by this treatment the unsaturated hydrocarbon molecule is acted upon, probably polymerized, so that it is increased to 10 times its original size.

The Voltol process involves the application of a glow-discharge in a vessel which is held under a vacuum of 25 inches of mercury. The operation is conducted at a temperature of about 175° F. in an ordinary atmosphere without the introduction of hydrogen or any other foreign gas. The electricity is derived from a commercial alternating current supply converted to a single-phase high-frequency current of 4,600 volts to produce the glow-discharge. Each unit uses 23 amperes. The electric current is introduced into the oil through electrodes which revolve at the rate of 1 revolution per minute. Each converter has a capacity of approximately 300 gallons per day.

Voltolized oils, whether vegetable or mineral, have a peculiar odor which is characteristic of the treatment and this fact seems to indicate that it is a peculiarity of the action of the glow-discharge upon the oil. Such treated oils do not change in any other property than the increased viscosity. An oil having a viscosity of 54 Saybolt at 210° F. was increased to 450 Saybolt at 210° F. by this process.

A detailed description of the process was presented by Elbert C. Isom in The Oil and Gas Journal, August 20, 1925, page 156. If you do not have a file, you may consult the reference in the New York Public Library, Fifth Avenue and Forty-second Street.

Oil Shales Contain Bituminous Material, the Source of Oil

A definition of oil shale includes the statement that oil cannot be extracted from such a shale by means of a solvent. Is this true?—N. M.

Many authorities agree that heat is necessary in order to obtain oil from a true oil shale, but experiments have been reported showing that some oil may be dissolved from shales when they are treated with suitable solvents under certain conditions.

The commonly accepted description of oil shales is that they are clayey, fine grained, fossil, sedimentary rocks that are quite fragile and usually show a splintery fracture. They contain bituminous material, called kerogen, which when heated in a retort, still, will yield an oil. This oil has a strong penetrating and unpleasant odor. Upon proper refining it will yield products similar to those obtained from petroleum.

Capacity of U. S. Oil Refineries Compared With Oil Production

What is the capacity of the refineries in the United States? How is this related to the volume of crude oil produced?—N. J.

The actual throughput of the operating refineries of the United States during the year 1934 was approximately 2,447,402 bbls. a day. There are 687 refineries listed in this country but only 496 were reported as in operation during last year, with a capacity of 3,815,470 bbls. a day. The 191 nonoperating refineries claim a daily capacity of 466,224 bbls. This makes a total capacity of 4,281,694 bbls. a day.

The quantity of crude oil produced each day in the United States is about 2,500,000 bbls., which is 1,781,694 bbls. under the total daily capacity of the listed refineries and 1,315,470 bbls. below the daily capacity of the 496 operating plants, according to the capacities estimated for the year 1934. There is an additional quantity of about 200,000 bbls. of oil imported into the United States each day.

The operating refineries charged to to stills about 2,447,402 bbls. of oil a day, which is equivalent to approximately 64 per cent of capacity, and very close to the daily production of 2,500,000 bbls.

It should be noted that the capacities of refineries are probably not so high as the figures indicate. A refinery to operate at the rated capacity of the stills must have every other unit doing its full share, tanks must be emptied and shipments of all products made without delay. To find a regular and steady market for each product of the refinery is a much desired object but seldom attained. Consequently, even in the most prosperous times, a refinery can be operated at full crude oil capacity for only a comparatively short time.

Another consideration having to do with real capacity of a refinery is the heavy demand for gasoline as compared with the other products. This causes a large part of the plant to be out of balance and an almost constant redesign with addition of new equipment is necessary to meet the ever changing conditions.

The Minerals Yearbook of the U. S. Bureau of Mines for 1934 contains a chapter, Part III, pages 691-706, on The Chemistry and Refining of Petroleum by H. P. Rue and H. M. Smith. These authors state:

"The refinery capacity in the United States at the end of 1932 was approximately 4,000,000 bbls. per day, and the demand for refined products was slightly over 2,000,000 bbls. A large part of the refinery equipment at the close of the year was obsolescent and a considerable portion could not operate economically under present prices.

"Under existing gasoline prices incident to surplus production installation of equipment to lower manufacturing cost was of prime importance. In conjunction with the factor of reducing manufacturing cost is one of improvement in quality of products. Gasoline especially was subject to this condition because of the race for "octane numbers" during the last two years. In fact, during the past year virtually every replacement or modernization of cracking equipment has been due primarily to the necessity for meeting competition in the quality of motor gasoline."

Analysis Showing Composition of Pennsylvania Grade Crude Oil

An analysis showing the products, with percentage yield, obtained from Pennsylvania grade crude oil will be appreciated.—N. B.

The petroleum produced in Pennsylvania is not all of the same quality, that known as Pennsylvania Grade is of exceptional quality and especially valued as a source of excellent lubricating oil. The analysis reported here represents a sample from the Bradford district.

Gravity of crude oil, °A.P.I.	44 3
Sulphur content, pct. (by wt.)	0 049
Gasoline, per cent	36.0
Gravity, °A.P.I.	64 4
I.B.P.	92
Max.	370
Octane No.	53
Kerosene, per cent	14
Gravity, °A.P.I.	46 2
Gas oil:	
(1)	12 5
(2)	10 6
Gravity, °A.P.I.:	
(1)	40 0
(2)	35.0
Non-viscous neut., per cent	1 6
Gravity, °A.P.I.	31 5
Vis. at 100° F.	110
Viscous neutral, per cent	4.1
Gravity, °A.P.I.	30 2
Visc. at 100° F., sec. (S.U.)	180
Visc. at 210° F., sec. (S.U.)	45
Wax, per cent	1.2
M. P. (A.S.T.M.)	122
600 Cyl. stock, per cent	19 5
Gravity, °A.P.I.	26.0
Visc. at 210° F., sec. (S.U.)	146
Loss, per cent	0.5

PERSONAL PARAGRAPHS

MONROE G. CHENEY, president of the Anzac Oil Corporation, Coleman, Tex., is spending some time in New York on business.

* * *

LEW TIDD, credit manager for Black, Sivalls & Bryson, Inc., Oklahoma City, Okla., spent several days during the week in Fort Worth and Dallas, Tex., on business.

* * *

C. A. McNAMARA, manager of warehouses for the Sinclair Refining Company, with headquarters at Tulsa, was a business visitor to the company's offices at Houston, Tex., the past week.

* * *

W. G. TSCHUDEN, vice president and general manager of the Sinclair Mex Oil Corporation at Tampico, Mexico, spent several days in Houston, Tex., last week visiting the company's offices.

* * *

RICHARD NETTLETON, of the Union Oil Company, has been appointed gasoline sales engineer for the southern California division after having spent six years in the company's Los Angeles refinery. Mr. Nettleton is a graduate of Minnesota University in mechanical engineering and has been in charge of the Union's dynamometer laboratory.

* * *

JAY E. CRANE has resigned as deputy governor of the Federal Reserve Bank of New York to become assistant treasurer of the Standard Oil Company (New Jersey). Mr. Crane, who is 43 years old, was connected with the Federal Reserve Bank for more than 19 years and previous to that for a short period was employed by the Commercial and Financial Chronicle.

* * *

C. HOBSON DUNN, trucking contractor of Wichita, Kans., has returned to his headquarters after a business trip to Texas.

* * *

C. E. EDGERTON, with the Wilcox Oil & Gas Company at Houston, Tex., has been transferred to the San Antonio, Tex., district.

* * *

W. K. WHITEFORD, vice president and general manager, British-American Oil Producing Company, Tulsa, was in his office this week.

* * *

MR. and MRS. CARL D. LAFERNEY have announced the arrival of a baby girl. Mr. LaFerney is an independent oil man located at Houston, Tex.

* * *

W. M. LOURCEY, land man for the Gulf Production Company, Fort Worth, Tex., has been appointed colonel by GOVERNOR JAMES V. ALLRED, on his personal staff.

* * *

J. C. MACQUIDDY, marine superintendent for the Standard Oil Company at Los Angeles Harbor, is back at his post, having recovered from a heart attack suffered some three months ago.

* * *

W. S. ACKERMAN, of the Associated Oil Company, was in Los Angeles, Calif., last week on company business but has subsequently returned to the home office at San Francisco, Calif.

* * *

E. H. FINCH, geologist for the Sinclair Prairie Oil Company, spent a few days in Houston, Tex., the past week on his way home to San Antonio, Tex., after returning from Venezuela where he has been stationed for several months.

HAROLD MOORE, of Moore & George, Ltd., has returned to London, England, after spending three weeks visiting refineries in Rumania.

* * *

H. W. CARDWELL, Allsteel Products Manufacturing Company, Wichita, Kans., is in Venezuela on a business trip. He made the journey from Miami, Fla., by airplane.

* * *

HERSHAL C. FERGUSON, geologist and paleontologist, formerly with the Shell Petroleum Corporation at Houston, Tex., has resigned and will do consulting geological work.

* * *

RONALD RANSOME, scout for the Skelly Oil Company, has been transferred from Amarillo, Tex., where he had headquarters while scouting the Panhandle district of Texas, to Ada, Okla.

* * *

DR. and MRS. EMMETT B. LAMB, of the Compania Petrolera Lobitos, left New York last week on the Grace liner, Santa Maria, for Talara, Peru. Doctor Lamb is resident physician for the company.

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T. E. SWIGART, vice president of the Shell Petroleum Corporation at Houston, Tex., and B. C. CLARDY, crude oil representative for the same company, have returned from a business trip to St. Louis, Mo.

* * *

JACK M. MILLER, district petroleum engineer for the Humble Oil & Refining Company, in charge of the Hilbig repressuring plant, has been transferred to the Government Wells, Texas, district, as district petroleum engineer.

VERNON L. TAYLOR, president of the Pioneer Oil & Gas Company, San Antonio, Tex., is visiting in California.

* * *

GEORGE ARMSTRONG, manager of Texas Steel Company, Fort Worth, Tex., was injured, and B. W. MOORE, 31, geologist, Tyler, Tex., had a skull fracture in an automobile accident near Fort Worth.

* * *

J. H. TRICKEY is in charge of the Llano Oil Company's office at Midland, Tex., and W. L. FICKET has been transferred from Fort Worth to that city by the company which has given up its Fort Worth offices.

* * *

R. A. GREEN has been appointed acting manager of the railroad lubricating oil sales department of the Standard Oil Company of New York, with headquarters in New York City. He succeeds the late WILLIAM F. WALSH.

* * *

P. K. WEST, general manager of Chemical Process Company, Breckenridge, Tex., is in Kansas and Oklahoma on business and is to go from there to Hot Springs, Ark., to do some fishing with JIM DUNIGAN, independent operator and supply company owner of Breckenridge.

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ALPHONZO E. BELL, RUSH M. BLODGETT, J. J. DOYLE, WILLIAM H. GEIS, LAURENCE C. KELLY, A. C. MATTEI, W. H. MORGAN, WILLIAM J. REID, W. J. SCHULTZ, L. VANDER LECK, and R. E. HAVENSTRITE were recently elected members of the board of directors of the Oil Producers Agency of California for a period of three years.

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A. D. JOHNSON, representative of the Oklahoma Brass & Iron Works, has been transferred to Los Angeles, Calif., to be West Coast representative.

* * *

R. H. EZELL, oil producer of Houston, Tex., has been spending several days in Los Angeles, Calif., but expects to return home within the next week.

* * *

ROY G. BARTON, of Los Angeles, Calif., who controls quite a number of oil leases in New Mexico, is making temporary headquarters at Clovis, N. Mex.

* * *

H. B. SIBE, manager of the railway and marine sales departments for the Sinclair Refining Company, with headquarters at New York, spent a few days in Houston, Tex., the past week on business.

* * *

J. D. HENRY has been appointed field superintendent at Elk Basin, Frannie and Grass Creek, Wyoming, by the Stanolind Oil & Gas Company. He was formerly superintendent of the Grass Creek Field.

* * *

PAUL G. BLAZER, of Ashland, Ky., was elected as president of the Swiss Oil Corporation to fill the vacancy created by the death of THOMAS A. COMBS, of Lexington, Ky. Mr. Blazer also is president of the Ashland (Ky.) Refining Company.

* * *

T. L. (PAT) REAGAN, petroleum engineer for the Stanolind Oil & Gas Company, formerly located at Longview and Fort Worth, Tex., has been transferred to the Tulsa office and made division engineer of the central division, which embraces Kansas, Oklahoma and Louisiana.

DO YOU REMEMBER?

From The Oil and Gas Journal Files

25 Years Ago

May 16, 1910

Associated Oil Co.'s (California) stock has been listed on the New York Stock Exchange. It sells for $50 to $52 per share in Los Angeles.

The Prairie Oil & Gas Co. has begun shipping oil through the Oklahoma Pipe Line Co.'s line from Du-Queen to the Louisiana line where the Louisiana Pipe Line Co. receives it for shipment to Baton Rouge. Only 6,000 bbls. of oil will be shipped daily until the Louisiana end of the line can handle more oil.

The Gulf Pipe Line Co. in Texas is now established in its own three-story office building in Beaumont.

20 Years Ago

May 15, 1915

The Cushing-Shamrock Field in Oklahoma contains 14,275 acres, and 1,432 wells. It has been defined on all sides but there are hundreds of inside locations yet to be drilled. It has passed its peak of 305,000 bbls. in one day and is now producing 250,000 bbls. per day, or an average of 175 bbls. per well. New wells are yielding from 200 to 5,000 bbls. initially.

Healdton, Okla., operators have had practically no market for their crude during the past six months. The World War caused a great loss of export trade and this and overproduction have combined to make a sick oil industry, all fields being more or less affected.

The Roxana Petroleum Co. buys two 160-acre leases in the Cushing Field from the Devonian Oil Co., paying $1,995,000 for the properties. They are known as the Maley Yarhola and Lindy Yarhola leases, and are in Sections 8 and 9, in Township 17-7.

10 Years Ago

May 14, 1925

The Smackover Field produced 448,000 bbls. a day on May 10, of which 361,200 bbls. was from the deep sand recently discovered by the Lion Oil Refining Co. The 448,000-bbl. production beats all records for one day production of oil in any field.

Gas from a 3,700-foot well at Okotoks, 20 miles out of Calgary, Alberta, was found by thermometer tests to have a temperature of 20 degrees below zero. It is owned by a subsidiary of the Imperial Oil Co.

Milan R. Bump, chief engineer for Henry L. Doherty & Co., dies in Denver, Colo. He was a vice president of the Empire Companies with headquarters in New York.

W. B. DAVIS, scout for the Sun Oil Company, Palestine, Tex., is the father of a new baby girl.

* * *

A. W. HARTIGAN, representing the Filtrol Company of California, with offices in New York City, is contacting refiners in the Mid-Continent this week, making Tulsa his headquarters.

* * *

ERNEST A. HANSON, deputy supervisor of the Mid-Continent District, Oil and Gas Leasing Division, U. S. Geological Survey, has been transferred from the Tulsa office to the office at Roswell, N. Mex.

* * *

HERBERT STOKES, of Billings, Mont., president of the Atlantic & Pacific Oil Company, was in Casper, Wyo., recently. His company is cleaning out old wells in the Warm Springs Field, Hot Springs County, Wyoming, preparatory to marketing part of the black oil production, which has been shut in for several years.

* * *

EDWARD T. STOREY, of Cheyenne, has been appointed state manager of Wyoming for the Standard Oil Company (Indiana) to succeed the late GEORGE H. GOOHS. He started in the oil business in 1926 with the Argo Oil Company and then went with the Midwest company when it took over the Argo and with the Standard when it took over the Midwest.

* * *

M. A. REITUS has been named representative for the Cameron Iron Works and Rector Well Equipment Company for Kansas and Oklahoma, and is to have headquarters at Tulsa. LEW HILTON, sales manager for the Cameron Iron Works, Houston, Tex., has returned to his headquarters after a trip to Tulsa and Oklahoma City, and points in Oklahoma and Kansas.

* * *

W. G. GISH, in charge of the land and geological departments, and H. SMITH CLARK, chief geologist, of the Texas division, both with the Sinclair Prairie Oil Company, with headquarters at Fort Worth, Tex., were business visitors to the company's offices at Houston, Tex., the past week.

* * *

GEORGE F. KAYE, a graduate of chemical engineering of California Institute of Technology and for several years a member of the Standard Oil Company's technical staff, and a research engineer for C. F. BRAUN, has been appointed technical advisor of the fuel oil, stove oil, and crude oil sales of the Union Oil Company. Mr. Kaye entered the employ of the Union Oil Company a little over four years ago.

* * *

W. R. BOYD, JR., executive vice president of the American Petroleum Institute, will address an oil luncheon sponsored by the Dallas Petroleum Club, at the Baker Hotel, on May 22. CAPT. J. F. LUCEY, of the Lucey Petroleum Corporation, Dallas, is arranging for a golf tournament on that or the following day. J. EDGAR PEW, vice president of the Sun Oil Company, Philadelphia, Pa., is due in Dallas at that time, and is expected to attend.

* * *

J. K. McGOLDRICK, president of the Texas Pipe Line Company of Oklahoma, had members of his organization come to Tulsa last week to attend the Oil and Gas Power Division of the A.S.M.E. meeting and to also discuss company affairs at meetings held during the same period. The visiting pipeliners included A. S. BAILEY, vice president and general manager of the Texas Pipe Line Company, and J. L. CULBERTSON, chief engineer, both of Houston, Tex.; OSCAR BURDEN, Wichita Falls, superintendent North Texas district, for the Texas Pipe Line Company; JACOB ALMAN, Shreveport, La., superintendent of East Texas division; J. J. O'BRIEN, division superintendent, Texas Empire, Bloomington, Ill.; C. M. SHULL, division superintendent, Texas Pipe Line Company of Oklahoma, Durant, Okla.; and A. G. LOVE, assistant superintendent of Texas Empire, Booneville, Mo.

From Roughneck to Vice Presidency

Col. Walter. B. Pyron, recently advanced to the vice presidency of a group of Gulf companies to succeed the late Underwood Nazro, started in the oil industry as a roughneck during the Sour Lake and Batson booms in Texas in the early part of the century. He worked for drilling contractors until 1907, when he got a job in the accounting department of the Gulf Production Company's office in Beaumont.

COL. WALTER B. PYRON

Two years later Colonel Pyron was sent to Shreveport, La., as general agent in charge of the North Louisiana and Arkansas division. While there he was elected a vice president. He continued in Shreveport till 1918, when he was transferred to the Fort Worth, Tex., office to assume charge of the Gulf's operations in North and West Texas. In 1924 he was moved to Houston, Tex., where he served as assistant to Mr. Nazro.

In 1928 Colonel Pyron, bearing the title third vice president, was transferred to Los Angeles, Calif., to head the Gulf operations on the Pacific Coast. In his new position he becomes vice president of the Gulf Production Company, Gulf Pipe Line Company, Gulf Refining Company of Louisiana and the Mexican Gulf Company.

Colonel Pyron was born in North Carolina, but moved to Texas in boyhood. During the World War he tried to enter military service, but was kept in North Louisiana overseeing oil operations to help fill the needs of America and the Allies. Immediately after the war he took a lieutenant's commission in the Texas National Guard. He advanced until he is now a lieutenant-colonel in the Texas Cavalry Brigade. His favorite recreations are horseback riding, flying and polo.

NEAL H. ANDERSON, ANGUS CRITES, MELVILLE DOZIER, JR., ROBERT GARRISON, DANA HOGAN, RALPH B. LLOYD, L. E. STEPHENS, F. A. TRAVERS, C. P. WATSON, H. E. WOODWORTH, and ROY W. YOUNG have been elected members of the board of directors of the Oil Producers Agency of California, for a term of two years.

* * *

C. F. YOUNG, formerly purchasing agent for the Stanolind Oil & Gas Company, Fort Worth, Tex., has been transferred to Houston, Tex., to become division purchasing agent for the Gulf Coast division. TOM MASSENGILL, formerly senior clerk in the purchasing department of the company at Tulsa, has been transferred to Fort Worth and promoted to purchasing agent for the North Texas and New Mexico division of the company.

* * *

D. G. SAFFORD, Houston, Tex., division engineer for the Stanolind Oil & Gas Company, has been transferred to Tulsa and promoted to assistant to the general superintendent of the producing department, reporting to C. S. SANDERS, who is also assistant to the superintendent. E. A. WAHLSTROM, formerly district engineer for the company, Midland, Tex., has been transferred to Fort Worth, Tex., to fill the vacancy left there by Mr. Safford's transfer.

* * *

HAROLD R. PAULEY, vice president of the Petrol Corporation, and H. J. McVICKERS, prominent independent oil operator at Huntington Beach, California, narrowly escaped death when the airplane in which they were flying from Los Angeles to Sacramento, Calif., crashed into Hopper Mountain 12 miles northeast of Fillmore, and was demolished. The airplane encountered a dense fog going over the Tehachapi Mountains and the pilot, a prominent Los Angeles lawyer, picked out the softest spot he could see. Mr. Pauley and Mr. McVickers escaped with minor injuries but the pilot, EUGENE OVERTON, was removed to the Good Samaritan Hospital with a fractured pelvis and internal injuries.

M. T. RATHVON, general manager of the Argo Oil Company, is visiting Oklahoma, supervising the completion of the company's well in the Three Sands Pool, Kay County.

* * *

C. PUCKETT is to open an office for the Iverson Tool Company at Amarillo, Tex., but will continue to carry on his work as drilling contractor in the Panhandle district.

* * *

JOHN A. ROWE has been appointed purchasing agent for Humble Oil & Refining Company with headquarters at Houston, Tex. He succeeds J. M. SITLER, who resigned to take a position with Standard Oil Company of New Jersey in New York City.

* * *

H. D. PATRIDGE, in the purchasing department of the Indian Territory Illuminating Oil Company, Bartlesville, Okla., was elected vice president of the southwestern district of the National Association of Purchasing Agents by the council meeting in Dallas, Tex., last week.

* * *

CARROLL V. SIDWELL, formerly with Amerada Petroleum Corporation at Seminole, Okla., has been made general superintendent in charge of production for the British-American Oil Producing Company, Tulsa, effective May 10. Mr. Sidwell will make his headquarters in Tulsa.

* * *

L. M. JONES, district land man in Kansas for the Stanolind Oil & Gas Company, who has maintained offices in Wichita, Kans., for the past seven years, was transferred to the Tulsa office of his company and assigned to duties in the land department there. C. E. MAULE, formerly located in Muskegon, Mich., succeeds Mr. Jones in the Wichita, Kans., office.

* * *

E. E. WILLIAMS, formerly in charge of operations in the Crowley district for Humble Oil & Refining Company, has been transferred to the Anahuac, Texas, district, as toolpusher. He replaces W. J. BROWN, who was transferred to the Thompson district.

* * *

W. L. HINDS, formerly production superintendent for the Amerada Petroleum Corporation on the Gulf Coast, with headquarters at Houston, Tex., has resigned from the company, and will organize a core drill contracting company with headquarters at Dallas, Tex. He has been succeeded by H. E. WALLACE, who has been the company's production superintendent in the Tomball Field.

* * *

R. G. BECHTEL, formerly production superintendent of the West Texas-New Mexico district of the Stanolind Oil & Gas Company, at Midland, Tex., was transferred to Houston, Tex., a couple of weeks ago and made division superintendent. FLOYD L. GEHR, formerly district engineer of the Panhandle and North Texas district, Pampa, has been transferred to Midland to succeed Mr. Bechtel. D. C. HARMAN, formerly division engineer of the central division, Tulsa, has been transferred to Pampa and made district superintendent.

* * *

E. A. WAHLSTROM, formerly district engineer of the West Texas and New Mexico district for the Stanolind Oil & Gas Company, has been transferred from Midland to Fort Worth and will be assistant division engineer of the entire division. T. H. ANDREWS, formerly field engineer at Hobbs, N. Mex., has been transferred to Houston, Tex., as division engineer of the new Gulf Coast division. T. E. KEEFER, formerly field superintendent of the Elk Basin, Wyoming, area, has been transferred to Hobbs, N. Mex., as field superintendent, succeeding J. P. GIBBONS, who has resigned. J. E. WOOTON, formerly production foreman in charge of the Cowden area in Ector County, has been made district engineer of the West Texas and New Mexico district.

NATURAL GAS DEVELOPMENTS

Commission Valuation Ordered in Texas Towns

AUSTIN, Tex., May 13. — Chairman Ernest O. Thompson of the Railroad Commission of Texas announced that the valuation engineers of the Gas Utilities Division are being sent to 43 towns on the Lone Star Gas System in North Texas for the purpose of making an inventory and appraisal of the property used by the Community Natural Gas Co., a subsidiary of the Lone Star Gas Co., in distributing gas to these towns. This work is being done in connection with future rate cases to be had by the commission to fix a fair rate to be charged for gas in such towns.

The towns concerned are those having population between 1,000 and 2,000, and immediately after this work is finished Chairman Thompson stated that similar work would be done in those towns having population between 500 and 1,000. The commission is restrained by injunction from doing this work in towns of 500 and less until the Lone Star rate case is finally decided by the courts, and when this case is finally decided, he stated it was the intention of the commission to complete the work in towns of 500 and less.

The cities whose properties are being evaluated are Whitewright, Van Alstyne, Leonard, Ladonia, Detroit, Wolfe City, Farmersville, Plano, Royse City, Rockwall, Pilot Point, Sanger, Lancaster, Garland, Forney, Midlothian, Italy, Alvarado, Itasca, Hubbard, Clifton, Dawson, Kerens, Wortham, West, Coolidge, Moody, Rosebud, Bremond, Rogers, Bartlett, Granger, and Round Rock.

New Texas Law Hearing Ordered by Commission

AUSTIN, Tex., May 13.—The Texas Railroad Commission set for May 16 its first proration hearing under the new gas conservation act to halt wastage of gas, principally in the Texas Panhandle, but it also applied to other fields.

The commission called for evidence on which to base an order preventing physical waste and also prorating production on market demand. Gas purchasers were asked to submit nominations of requirements for June.

Use of sweet gas for carbon black manufacturing was prohibited and sour gas was required stripped of its gasoline content before burning for that purpose by the new law. Those and other provisions against physical waste will not become effective against sweet gas until August 1 and sour gas October 1.

LONDON FRANCHISE VOTE

LONDON, Ontario, May 11.—The city council has authorized a vote of the ratepayers of London on June 11 on the granting of a 20-year franchise to the City Gas Co. to supply natural gas from the Dawn Field. The company at present supplies artificial gas. The project involves construction of a 55-mile pipe line from the Dawn Field and extension and improvement of the London distributing system, the outlay being estimated at $1,000,000.

LOUISIANA GAS LINE

Arkansas-Louisiana Gas Co., a subsidiary of Cities Service, has begun construction on its 10-inch electrically-welded gas line from the Sligo gas field, Bossier Parish, Louisiana, to tie in with its 20-inch gas trunk line from Monroe to Shreveport in North Louisiana. The line will be completed within 30 days. It is 9 or 10 miles in length.

Fifty-seven Million Feet of Gas Added to Potential Output of Potter County

COUDERSPORT, Pa., May 13.—Fifty-seven million feet a day were added to the potential output of Potter County, Pa., gas fields in the week ending May 10. Sylvania Natural Gas Corp. completed its No. 2 Z. L. James, Allegany Township, for 24,000,000 feet at a total depth of 5,175 feet, in the Oriskany sand. The top of the sand was found at 5,168 feet and first gas at 5,169 feet. Rock pressure was gauged at 1,920 pounds. New York State Natural Gas Co. completed its No. 1 Earl Pye, Genesee Township, for 33,000,000 feet at a total depth of 5,063 feet. The top of the sand was found at 5,047 feet and first gas at 5,049 feet.

In Tioga County, E. Cabot completed his W. F. Burroughs test, Gaines Township, dry and abandoned at 6,963 feet. The well produced a bailer of salt water a day before closing down. A fourth completion, in the adjacent New York area, was dry and abandoned. This was in Cattaraugus County, Leon Township, on the John Carvey farm, where Belmont Quadrangle Development Co. finished at 3,858 feet after finding the White Medina at 3,823-33 feet.

Pennsylvania Drilling

East Penn Development Co. was drilling at 691 feet on the Clarence Cooley farm, Lawrence Township, Tioga County. Same company was rigging up on the Ray French farm, Clymer Township, same county. J. B. Reed was still shut down on the George C. Page farm, Allegany Township, Potter County. Other Potter County operations were: Sylvania Natural Gas Corp., drilling at 4,900 feet on its No. 1 Z. L. James, Allegany Township. The Tully was found at 4,636 feet in this test. Potter Development Co. was drilling at 4,910 feet on the McAllister farm, Harrison Township. New York State Natural Gas Co. was drilling at 4,940 feet on the Margaret E. Sanford farm, Genesee Township.

P. H. Fitzstevens was drilling at 2,510 feet on the M. Fitzstevens farm, Genesee Township, Potter County. Updegraph and others were drilling at 840 feet on the Theodore Cobb farm, same township and county. Cowanesque Gas Co. was drilling at 539 feet on the E. A. Furman farm, Allegany Township, same county. Hanley & Bird made a location on the George Burd farm, same township and county. Williamsport Natural Gas Co. was moving in on the Hile lands, Genesee Township, Potter County. Sylvania Natural Gas Corp. was spudding in on the Merle A. Hill farm, same township and county. Penn United Natural Gas Co. was drilling at 460 feet on the Charles Morris farm, same township and county. Stocum and others were digging cellar on the L. Thompson farm, same township and county.

Middle District

Wiliam Snee and others were drilling at 1,750 feet on the proposed deep test for the Oriskany on the Summit Hotel property, South Union Township, Fayette County. All other operations reported were in Clarion County. Whitling Oil Co., drilling on fee property, Beaver Township, Clarion County, was in hard shells at 730 feet. Dempseytown Natural Gas Co. was down 1,010 feet in a pocket on the Brown farm, Paint Township, same county. Cores taken of the third sand on this well showed as follows: first, 946 feet; second, 947 feet; third, 950 feet; fourth, 951 feet; fifth, 952 feet; sixth, 953½ feet. The third sand was drilled from 956½ feet to 964½ feet with regular bit. The fourth sand was too hard to core, and 980 feet to 990 feet was not cored. Best pay was found in the fourth core sample (951 feet).

Sweitzer Brothers were drilling in slate at 600 feet on the G. Sweitzer farm, Beaver Township, Clarion County. Exley Brothers were down 150 feet on the F. Sweitzer farm, same township and county. Kaber & Kiser were shut down on the Carson farm, same township. Alum Rock Gas Co. completed a test on the Cummings farm, Ashland Township, same county, at a depth of 1,254 feet. The third sand was shot with 24 quarts at 1,156-64 feet, and the fourth sand with 15 quarts at 1,189-94 feet. Slicker Pipe Tool Co. was drilling in slate and shells at 420 feet on the Slicker farm, Richland Township, same county. Vogelbacher Brothers were rigging up on the Vogelbacher farm, Knox Township, same county. Weaver Motor Co. was rigging up on the Mahle farm, Washington Township, same county. Frank Hennemuth was rigging up on the J. F. Hennemuth farm, Washington Township, same county.

New York Drilling

Empire Gas & Fuel Co. was setting casing at 4,730 feet on the M. Costella farm, Wiling Township, Allegany County. The Tully was found at 4,114 feet on this test. Godfrey L. Cabot was drilling at 1,353 feet on the Ed Donlan farm, Camden Township, Oneida County. Same party was drilling at 250 feet on his No. 1 Roberts, same township and county. Rome Syndicate was shut down at 500 feet on the Meaker farm, same township and county. Oneida Development Co. was drilling at 1,014 feet on the J. Griffin farm, same township. Godfrey L. Cabot was rigging up on the Comins farm, same township. Benholm Trust Co. made a location on the H. Vandewalker farm, same township. Property Shares Inc. was drilling at 300 feet on the E. Williams farm, Florence Township, Oneida County. Wittmer Oil & Gas Co. was building rig on the Bert Bennett farm, Howard Township, Steuben County. Southwestern Development Co. was moving in on the T. Moran farm, Alma Township, Allegany County. A. B. Button was shut down at 810 feet on the Earl Dodson farm, Junius Township, Seneca County. Trumbull and others were still shut down at 900 feet on the W. B. Lasher farm, Throop Township, Cayuga County. Kaufman and others made a location on the M. G. Phipps farm. Allen Township, Allegany County. Wyoming Natural Gas Co. was shut down at 1,983 feet on the C. H. Caullings farm, York Township, Livingston County.

GLEICHEN GAS PROJECT

GLEICHEN, Alberta, May 11.—Plans are being considered by the Canadian Western Natural Gas, Light, Heat & Power Co. of Calgary for distributing natural gas in Gleichen. It is expected a gas supply will be secured by local drilling rather than by extension of existing transmission lines. Drilling by the A. W. Dingman interests in the Gleichen area in 1912 shows a small gas production at 800 feet and a larger flow at 1,500 feet. Several wells would likely be required to supply the town.

Pipe Line From Panhandle as Viewed in Congress

AUSTIN, Tex., May 13.—The proposed $60,000,000 Panhandle pipe line to carry natural gas to Detroit and St. Louis, "seemed practical and to have real merit," to Vice President John N. Garner, he said in a telegram to Halmond K. Stanfield and Eugene Worley, members of the Texas house.

A telegram from Representative Marvin Jones said Secretary Ickes had given assurance that funds loaned for the project would be allocated to all of the states through which the line passes and not be charged entirely against Texas.

"I would like to see any kind of project or policy favorably considered," Vice President Garner said, "that is calculated to preserve and utilize resources of Texas or any other state of the Republic. As the proposed project was explained to me by Mr. Anderson it seemed practical and to have real merit."

Dispatches from Washington reported opposition among members of Congress from the other commonwealths, to the idea of charging proportionately against all states involved, the cost of building the line from Texas to St. Louis and Detroit.

Senator Capper of Kansas: "I don't think Kansas would get very much good out of it and I don't think we would want it charged up to Kansas."

Senator McGill of Kansas: "It doesn't sound very good to me and I think I am opposed to that sort of a proposition."

Representative Mapes of Michigan, who visited the Panhandle with the Cole oil committee: "I don't think it would be taking care of much unemployment in Michigan."

Representative Crowe of Ohio: "If the line should route through Ohio and Ohio have no value or use from the line I would certainly be opposed to charging it against Ohio's quota, particularly if the only benefit was to be the planting of a pipe line in our soil. Of course, if the gas were distributed in Ohio, that would require further study. We have a lot of gas from the West Virginia Field now."

Representative Carlson of Kansas: "I think I would be opposed to that idea. The building of a pipe line doesn't involve any great amount of labor, and its cost is mainly for pipe and machinery."

Representative Carpenter of Kansas: "I certainly do not want something checked off Kansas' quota for Texas' benefit. If the allocation would prevent Kansas from getting something Kansas might want more I would oppose it."

Representative Arnold of Illinois: "Why should the State of Illinois contribute to the development of Texas? This looks to me like going entirely beyond the bounds of propriety, and I'm going to look into it."

Senator Thomas of Oklahoma asserted: "That procedure would be unthinkable and ridiculous. I don't see how they can charge anything against us without our consent."

Senator Vannuys of Indiana: "My first reaction, without careful study, is that I would seriously oppose any attempt to curtail Indiana's PWA quota in this fashion. We have several gas pipe lines serving our State now."

PIPE CORROSION TEST

The subcommittee on pipe coatings and corrosion of the American Gas Association has decided that the third of the four groups of specimens of coated pipes, buried in 14 places in the fall of 1929, will be removed and examined by the research associate this summer.

MARKET RECORD OF OIL SECURITIES

Active Oil Stocks Listed on New York Stock Exchange

Compiled by Carl H. Pforzheimer Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

1935 High	1935 Low	Week ended May 11 Sales	Week ended May 11 High	Week ended May 11 Low	Week ended May 11 Close	Stocks—	Total shares outstanding	Par value	Dividend rate	Payable or last paid	Dividends paid in 1934	1934 High	1934 Low	1933 High	1933 Low
68	48	9,100	68	63¼	67½	Amerada Corp.	774,875	N.P.	50cQ	4-30-35	$2.00	55⅝	39	47⅝	18½
26¼	21⅜	32,500	26¼	23¾	25⅞	Atlantic Refining	2,673,834	$25	25cQ	6-15-35	1.00	35¼	21½	32½	12⅝
9½	5⅞	47,200	9½	8¼	9⅜	Barnsdall Corp. A	2,248,795	$5	....	5-11-31	....	10	5⅞	11	3
7¼	3⅜	27,300	7	6	7	Columbia Gas & Elec.	11,610,036	N.P.	....	5-15-34	‡ .25	19¼	6⅝	28⅛	9
9⅜	6½	117,000	9⅜	7¾	9	Consolidated Oil Corp.	14,218,835	N.P.	14c	10-31-34	.42	14¼	7¼	15¾	5
21⅜	15⅛	55,600	21⅜	19⅛	20¾	Continental Oil of Delaware	4,738,593	$5	12½c	4-30-35	.50	22¾	15¾	19⅝	4⅞
18⅞	11¾	7,300	16½	15	16⅜	General Asphalt	387,149	$10	....	6-15-32	....	23½	12	27	4⅝
3⅜	1½	4,300	3	2⅝	2⅞	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	5⅝	2½	7⅜	1⅞
1⅞	¾	2,300	1⅛	⅞	1⅛	Louisiana Oil Refining	1,302,158	N.P.	....	.....	....	3⅜	¾	4	⅝
13⅛	9½	19,400	13¼	12	12⅞	Mid-Continent Petroleum	1,857,912	$10	15c	5-15-35	.50	14¾	9⅛	16	3⅜
15¾	9	6,900	15¾	13¼	15⅝	National Supply of Delaware	382,591	$25	....	5-15-31	....	21⅛	10	28⅝	4
12½	9¼	48,500	12½	11⅜	12½	Ohio Oil Co.	6,563,107	N.P.	15c	6-15-35	.45	15⅞	8½	17⅜	4⅜
9½	7	3,200	9⅜	8	9	Pacific Western Oil	1,000,000	N.P.	40c	11-30-34	.40	9⅜	5½	9½	3
1⅜	⅝	500	1	¾	⅞	Panhandle P. & R.	198,770	N.P.	....	.....	....	2½	⅝	4¼	⅝
21½	13¾	58,000	21½	19¾	21¼	Phillips Petroleum	4,154,687	N.P.	25c	6-1-35	1.00	20¾	13⅜	18¾	4⅝
11½	6½	17,600	11½	10½	11⅛	Plymouth Oil Co.	1,014,082	$5	25c	3-30-35	75c & 4% Stk.	16¾	7¼	17⅝	6⅜
8⅝	5⅞	39,600	8⅝	7¼	8⅜	Pure Oil	3,038,370	N.P.	....	9-1-30	....	14⅞	6⅛	15⅜	2½
36½	29½	300	36½	36	36½	Royal Dutch N. Y. shares	432,224	$14	$1.35	7-31-34	1.35	39½	28⅝	39¾	17⅝
35⅞	20¾	21,600	35⅞	32⅞	34⅛	Seaboard Oil of Delaware	1,204,460	N.P.	15cQ†	6-15-35	1.00	38⅜	20¾	43⅜	15
9	6½	54,200	9	7⅛	8¾	Shell Union Oil	13,070,625	N.P.	....	6-30-30	....	11½	6	11⅝	4
87⅝	64½	4,200	87¾	78½	87	Shell Union Oil pfd.	400,000	$100	....	7-1-31	....	89	57	61	28½
18¾	13½	10,200	17	15¾	16⅛	Simms Petroleum	461,698	$10	50c	2-1-35	.55	17⅛	7¼	12⅝	4⅞
10⅜	6½	4,400	10⅜	9	10⅛	Skelly Oil	1,008,514	$25	....	12-15-30	....	11½	6	9⅞	3
14⅝	11	78,700	14⅝	13⅞	14½	Socony-Vacuum	31,019,694	$25	15cQ	3-15-35	.60	19⅞	12½	17	6
37⅜	27¾	49,200	37⅜	34¼	37	Standard Oil of California	13,102,900	N.P.	25c	6-15-35	1.00	42⅞	26½	45	19⅛
27¼	23	30,000	27¼	25⅝	26⅞	Standard Oil (Indiana)	15,941,894	$25	25cQ	3-15-35	1.00	32¾	23¼	34	17
32	26½	No sales	..	..	..	Standard Oil of Kansas	200,000	$10	50cQ	10-31-34	2.00	41	26	39⅞	12⅜
46⅛	35⅜	56,500	46¼	43⅝	45⅝	Standard Oil of New Jersey	25,740,065	$25	50cSA‖	6-15-35	1.25	50⅛	39¼	47½	22⅝
75	60	2,100	75	72⅞	74⅞	Sun Oil	1,733,013	N.P.	25cQ	6-15-35	$1 & 9% Stk.	74¼	51½	59	35
23⅜	16½	38,900	23⅜	21⅛	23	Texas Corp.	9,486,417	$25	25cQ	4-1-35	1.00	29⅜	19⅝	30⅛	10⅝
4¼	4¼	9,200	4⅛	3¾	4⅛	Texas Pacific Coal & Oil	880,703	$10	....	12-31-29	....	6½	2½	6½	1⅝
11⅛	7⅝	33,900	11⅛	10	10¾	Tide Water Associated	5,618,672	N.P.	....	2-16-31	....	14⅜	8	11⅝	3⅛
99	84	2,500	99	95¾	98⅜	Tide Water Associated pfd.	666,524	$100	$2§	4-1-35	§8.50	87	64½	65¼	23½
19½	14¾	18,700	19½	18⅛	19¼	Union Oil of California	4,386,070	$25	25cQ	5-10-35	1.00	20½	11½	23⅜	8½
26¼	20⅞	2,800	26⅛	24	26	Union Tank Car Co.	1,200,000	N.P.	30cQ	3-1-35	1.20	25¾	15⅝	22¾	10½
2⅝	1	800	2	1¾	2	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	5¾	2	5½	2

*Ex-dividend. †Plus extras. ‡Payable in preferred stock. §On account of accumulated and current dividends. ‖Dividend 4/75 Mission Corp. paid 3-15-35.

Active Oil Stocks Listed on New York Curb

Compiled by Carl H. Pforzheimer Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

1935 High	1935 Low	Week ended May 11 Sales	Week ended May 11 High	Week ended May 11 Low	Week ended May 11 Close	Stocks—	Total shares outstanding	Par value	Dividend rate	Payable or last paid	Dividends paid in 1934	1934 High	1934 Low	1933 High	1933 Low
38¾	30½	550	38½	38	38½	Buckeye Pipe Line Co.	200,000	$50	75cQ	6-15-35	$3.00	38	26	39¾	25
4¼	1⅝	52,700	4¼	3	3⅞	Carib Syndicate	799,020	25c	....	.....	....	5½	1½	7¾	⅛
157	115	50	131	131	131	Chesebrough Mfg. Co.	120,000	$25	$1Q†	3-29-35	11.50	150	116	129	71
1½	¾	26,500	1½	1¼	1½	Cities Service	37,804,394	N.P.	....	6-1-32	....	4¼	1¼	6¼	1½
⅛	¾	1,600	⅛	¾	⅞	Colon Oil	2,200,000	N.P.	....	.....	....	3¼	½	4	¼
⅞	⅜	300	⅝	⅛	⅝	Cosden Oil	399,687	$1	....	.....	....	3⅞	½	3⅞	1⅜
15⅛	10	41,300	15⅛	14¾	14⅞	Creole Petroleum	6,974,356	$5	....	.....	....	14⅜	9⅝	12	4¾
6¼	4¼	2,300	6¼	6	6	Darby Petroleum	509,696	$5	25c	1-25-35	.50	7½	4⅛	8	2⅛
1½	¾	200	1½	1½	1½	Derby Oil & Refining	263,162	N.P.	....	.....	....	2¼	1	2¾	⅞
38	33¼	No sales	..	..	..	Eureka Pipe Line	50,000	$50	$1Q	5-1-35	4.00	37	30	41¾	20
69¾	50¼	19,700	69¾	60½	69½	Gulf Oil Corp.	4,538,101	$25	....	10-1-31	....	76¾	49¾	62	24
59⅜	44	16,700	59⅜	54½	59	Humble Oil & Refining (new)	8,923,935	N.P.	25cQ	4-1-35	$1.25	496	33¼	105½	40
19⅜	15⅜	70,400	19⅜	17	19⅜	Imperial Oil of Canada	26,857,152	N.P.	25cSA†‡	6-1-35	.92½	17⅞	12⅝	15⅞	6½
4⅝	3⅝	500	4⅝	4⅜	4⅝	Indiana Pipe Line	300.000	$10	15cSA	5-15-35	.35	6⅞	3⅝	8	3⅛
36½	28	69,400	36½	33⅛	36⅜	International Petroleum	14,247,088	N.P.	75cSA†‡	6-1-35	2.28	33⅜	19⅜	23½	8⅞
8⅝	4⅜	23,300	8⅝	7¾	8⅝	Louisiana Land & Exp.	3,000,000	N.P.	....	.....	....	5	2½	2¼	⅛
6¾	3½	400	6	6	6	Lion Oil Refining	270,000	N.P.	....	10-27-30	....	6	3⅜	9½	1¼
6¼	4½	4,500	6	5¼	6	Lone Star Gas	5,382,723	N.P.	15c	2-15-35	‖ .16	8⅜	4¼	11⅞	4⅜
5¼	4⅛	3,200	5¼	4⅞	5¼	Mountain Producers	1,682,182	$10	15cQ	4-1-35	.60	5½	4	6½	2½
17	11⅞	9,600	17	15	16⅞	National Fuel Gas	3,810,183	N.P.	25cQ	4-15-35	1.00	18⅛	13⅛	20	10
8¼	6⅝	300	8¼	8¼	8¼	National Transit	509,000	$12.50	35cSA	12-15-34	.75	9½	7	10	5½
2⅝	2	1,400	2¼	2¼	2¼	New Bradford Oil	1.445,202	$5	10cSA	3-15-35	.20	2½	1¾	2⅛	½
2⅛	1⅜	2,300	1⅜	1	1¼	New Mexico and Arizona	1.000.000	$1	....	.....	....	2¾	1	1⅞	½
3⅝	3	100	3½	3½	3½	New York Transit	100.000	$5	15cSO	10-15-34	.80	4¾	3	4⅞	3
6¼	5¼	200	6¼	6¼	6¼	Northern Pipe Line	120,000	$10	25cSA	7-1-35	.50	7	4⅝	6⅛	4¼
2¼	1¼	8,000	1⅝	1½	1½	Pantapec Oil	1.608,700	N.P.	....	.....	....	2⅝	⅞	3⅜	½
1¼	1	100	1	1	1	Ryan Consolidated	296.931	N.P.	....	.....	....	3⅜	⅞	4¼	⅝
7½	5⅝	4,300	7½	6⅞	7⅜	Salt Creek Producers	1,496,859	$10	20cQ	5-1-35	.80	7⅞	5½	9¼	3½
28⅜	21⅝	7,900	28⅜	25	27¼	South Penn Oil	1,200,000	$25	30cQ	3-30-35	1.20	26½	17½	22⅛	11
4¾	3⅞	100	4½	4½	4½	Southern Pipe Line	100,000	$10	15cSA	3-1-35	.25	5½	3½	6	2⅛
52¼	45¼	100	48½	48¼	48½	Southwest Penna. Pipe Lines	35,000	$50	$1Q	4-1-35	5.00	47	41	43	24½
21⅝	18	6,500	20	18⅞	19⅞	Standard Oil of Kentucky	2.606,983	$10	25cQ†	3-15-35	1.50	18⅝	14⅝	19¼	8⅜
10⅝	7¾	400	10⅝	10	10⅝	Standard Oil of Nebraska	190,822	$25	....	6-20-34	.50	16⅞	8¼	20½	11
18	11½	1,800	18	15½	17	Standard Oil of Ohio	753,740	$25	....	1-3-33	....	28½	12¼	41	15½
1¼	1	3,700	1⅛	⅛	1	Sunray Oil	1,610,810	$1	....	4-15-31	....	2	⅛	1½	¼
6⅞	5	5,400	6¼	5⅝	6⅛	Texon Oil & Land	936,028	N.P.	15cQ	3-29-35	.90	11	4⅝	13¾	6¼

*Ex-dividend. †Plus extras. ‡Payable in Canadian funds. §Includes 50 cents on old $25 par value stock. ‖Payable in preferred stock.

Note—In comparing highs and lows for the several years in the two tables, it will be necessary to take into consideration cases where there have been stock split-ups.

FIELD PROBLEMS FROM READERS

Edited by Thomas F. Smiley

This department is conducted in order that men connected with the drilling, producing and transporting branches of the petroleum industry may obtain aid in solving problems that confront them in their work. Readers are invited to send questions freely. These questions will be placed in the hands of persons capable of answering them authoritatively, and the answers, based on the best available information, will be published.

Each question should give as much detail as possible, especially if it involves depths of sands, types of sands and operations on adjoining or nearby proptries. The source of questions will be considered confidential, and only the initials of the sender will be published. Questions involving patented processes, intricate formulas or estimates of cost cannot be answered. If an immediate answer is important, one will be given by mail when the writer requests it.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or improved old ones.

More Facts Given on Laying One Line of Pipe Inside Another

In the February 28, 1935, issue of your publication your answer to G. N. E. is not quite correct in so far as it relates to the Gulf Pipe Line Co. crossing of the Houston ship channel, and the facts may interest you.

Gulf Pipe Line Co. laid two 6-inch lines across the Houston ship channel at Lynchburg in 1921, in a ditch dredged deep enough to clear the then proposed channel. One line failed by corrosion in 1929 and the other commenced leaking in 1930.

Guy Crisman, then assistant superintendent of the Gulf Coast division for the Gulf Pipe Line Co., was sent to repair this crossing, with the suggestion from N. H. Perry, general superintendent, that he put a new 4-inch crossing inside the old 6-inch.

Repair was made by pushing through the 6-inch line a string of five-eighths inch and three-quarters inch steel sucker rods, made up as they went in, pulling through a seven-eighths inch steel wire cable, then pulling (and pushing) through a string of 4-inch butt-welded pipe. A bull plug was welded in the front end of this string, having an eye to take the cable.

After the 4-inch line was in place inside the old 6-inch, a quantity of pipe coating made by the Gulf Refining Co. was pumped in from each end to fill the space between the lines.

This 4-inch crossing, 1,030 feet long, was in use from the time of its placing until 1933, when two new 6-inch crossings were placed in a ditch dredged to accommodate proposed future deepening of the channel. However, the 4-inch line is still in good condition in 1935.

This crossing is part of a 6-inch line, 14 miles long, and the difference in pressure caused by the substitution of 4-inch for 6-inch was not noticable on a 1,000-pound pressure gauge at the pumping station.

Along this line, it may interest you to know that in making a crossing of the Calcasieu ship channel, in Calcasieu Parish, Louisiana, in 1934, on the Gulf Refining Co. of Louisiana 6-inch line from East Hackberry Field to Vinton, enough of the 6-inch pipe to make the crossing was inclosed in 8-inch pipe, one end swaged down and welded to the 6-inch pipe, other end with a slip joint, and pipe coating pumped in between line and casing before the crossing was pulled.—W. P. S.

Many Factors Enter Into Subject of Proper Spacing of Wells

In the matter of spacing oil wells have engineers agreed on any rule or formula that can be applied to fields in general? I have seen a reference to "Cutler's square root rule," but I do not know what it is. I would appreciate such information as you can give me on this subject of well spacing—L. G. F.

Well spacing has been the subject of wide differences of opinion in past years and in the space available here it would be impossible to cover all views expressed. With all that has been written, however, engineering opinion today is to the effect that no inflexible rule can be applied to all fields. A paper by James O. Lewis presented before the A.I.M.E. meeting in October, 1934, discussed this subject interestingly, and the following excerpt from it seems to offer just about the information you seek in as small compass as is possible:

"The influence (of spacing) upon recovery is relative; that is, for a specific set of conditions the ultimate recovery would be a certain per cent for each different spacing. But the ultimate productions measured in barrels for different properties are influenced by many other factors than spacing. These include among other factors, sand thickness, porosity and permeability, the physical characteristics of the oil, the volume and pressure of the gas, the manner in which the well is finished and operated, and lastly time. Since all other factors than spacing vary widely, it cannot be expected that, in comparing actual production figures of properties differently spaced, there will be exact conformity to any rule for spacing.

"In 1924, W. W. Cutler, Jr., announced his well-known rule for oil well spacing:

"The recovery from wells of equal size producing under similar conditions in the same pool is proportional to the average distance that the oil moves to get to the well. In other words comparative ultimate recovery is proportional to the spacing distance.

"Cutler recognized that this could not be an exact rule for there are other factors than distance involved in recovery, and he gave it as only a tentative rule approximately correct when used within the limits of ordinary variation in spacing. That the rule could not be exact is readily demonstrated.

"Assume that at 800 feet spacing, recovery is 20 per cent.

"At 400 feet spacing, recovery would be 40 per cent.

"At 200 feet spacing, recovery would be 80 per cent.

"At 100 feet spacing, recovery would be 160 per cent.

"It is obvious that the reduction in recovery must be something less than in proportion to spacing distance. It is likewise apparent that the relative distance the oil must be moved is not the only important factor having to do with relative recovery.

"One of the reasons and probably the most important one, why recovery deviates from the rule is noteworthy. As a sand is depleted of its oil content, the gas, because of bypassing, becomes less and less effective as an agent for forcing the oil from the sand and consequently a larger and larger proportion of the gas energy is wasted in moving each additional barrel. This means that to recover the second 10 per cent of oil from a field there is required a considerably larger amount of energy than for the first 10 per cent and to recover a third 10 per cent requires a tremendously larger quantity of gas energy than the first 10 per cent. Thus the gas energy saved in closer spacing is partly wasted in less effective expulsion as the percentage recovery is increased.

"Later W. P. Haseman and R. W. Phelps advanced other formulas, but whether more correct or not, they differed so little from Cutler's rule when used within the usual limits in spacing distance that his simpler approximation can be considered sufficiently accurate for practical purposes. When it is sought to apply spacing rules it is found that there are so many uncontrollable and indeterminable factors (examples are the future price of oil and property lines) that it is useless to be very exacting. It is, however, important to understand the principles of spacing and to apply them correctly.

"In testing and applying these spacing rules, two of the fundamental principles have been surprisingly overlooked. Data have been presented purporting to test the rule which are meaningless, and Cutler's findings have been indiscriminately applied to conditions to which they have no bearing."

Most of World's Great Oil Pools Marked by Surface Seepages

Is it always true that seepages of oil are to be found at the surface wherever there is a large oil pool underground? The precise question in my mind is this: You have stated that the geophysical instrument does not show where oil is, but shows only a structure favorable for oil accumulation. Now then, if we find such an underground structure, with no surface indications of oil, is there any use in drilling?—S. T. E.

When the oil industry was in its infancy, search for oil was very naturally confined to spots where seepages of oil were to be seen, and for some time there was an inclination to distinguish between oil and asphaltic or bituminous residues popularly called "pitch." This was manifestly so in the case of the Trinidad and Bermuda "pitch" lakes, which constitute the world's largest accumulations of asphalt known.

Old-time prospectors were largely influenced in their choice of sites for drilling by the extent and distribution of such positive evidences of oil, as they were nearly always found to be related to types of structures known to favor the concentration of hydrocarbons. As knowledge accumulated explorers ventured further afield, and then arose a disquieting and uncalled-for disposition to minimize their importance if not to despise their value. Some went so far as to regard them rather as evidence of exhausted oil measures than as indications of prolific oil fields. Any dispassionate study of the circumstances which have led to the development of so many of the world's greatest oil fields would have dispelled this fallacious conclusion; nevertheless, the widespread dissemination of the viewpoint acted as a check to enterprise in localities which later acquired oil fame.

No thoughtful student of the subject ever considered that failure to discover surface oil manifestations necessarily condemned a structure underlaid by strata suspected to be petroliferous, but many seriously questioned the existence of oil in commercial quantities at depths that were then within range of the drill, say 2,000 to 3,000 feet, if there were no surface indications of its presence.

A cursory review of the events which led to the development of all the great oil fields of the world prior to the advent of deep drilling (3,000 to 10,000 feet) illustrates to what extent surface shows of hydrocarbons were the main factors in attracting and concentrating attention. But for the discoveries which followed shallow development the deeper fields in the same region where no surface indications were observed might never have been tested. With the exception of some of the oil fields of the Eastern, Mid-Continental and Rocky Mountain states, practically all the great oil fields of the world were marked by oil and gas issues near the crests of anticlines or the apices of domes.

Why Was It Called That?

NEBULA

The geologist is familiar with the nebular hypothesis, which supposes the various bodies of the solar system to have been evolved from a widely diffused nebular form of matter; but not all may know that a nebula, or island universe 500,000,000 "light years" from the earth was photographed recently from Mount Wilson observatory in California. This is said to be the most distant point to which man's vision ever has been extended. The photograph was taken with the world's largest telescope, which has a 100-inch reflector. The new 200-inch lens cast at Corning, N. Y., for a telescope on Mount Palomar, Calif., will increase the magnifying power of the 100-inch lens fourfold, making it possible to see a volume of space 27 times as great as is visible with the present Mount Wilson telescope. The word "nebula" was adopted from the Latin. It means vapor, mist, cloud.

Oil, Gasoline Futures on Commodity Exchange

NEW YORK, May 13.—Prices for gasoline futures on the Commodity Exchange displayed a reactionary tendency over the past week. Quotations declined 7 to 11 points. Comparatively little business was recorded. Sales totaled 168,000 gallons, involving June delivery at a high of 5.97 cents and a low of 5.87 cents (federal tax included).

Crude oil futures declined probably in sympathy with lower prices for gasoline futures. Although the market remained inactive, quotations declined one-half cent. The June delivery is now quoted at $1.22½ a barrel, while the April, 1936, position is quoted at $1.28½ a barrel.

GASOLINE

	Close	High for week	Low for week	Sales (gallons)
June	5.85B	5.97	5.87	168,000
July	5.93B	....	....	.....
Aug.	5.97N	....	....	.....
Sept.	6.01B	....	....	.....
Oct.	6.05N	....	..	.....
Nov.	6.10N	....	....	.....
Dec.	6.15B	..	....	.....
Jan.	6.17N	....	....	.....
Feb.	6.19N	....	....	.....
Mar.	6.21N	....	....	.....
Apr.	6.23N	....	....	.....
Total				168,000

The above prices for future delivery of gasoline are ex-licensed tanks in delivery areas and include 1 cent per gallon federal tax.

CRUDE OIL

	Close	High for week	Low for week	Sales (barrels)
June	1.22½N	....	....	.....
July	1.23½N	....	....	.....
Aug.	1.24½N	....	....	.....
Sept.	1.25 N	....	....	.....
Oct.	1.25½N	....	....	.....
Nov.	1.26 N	....	....	.....
Dec.	1.26½N	....	....	.....
Jan.	1.27 N	..	....	.....
Feb.	1.27½N	....	....	.....
Mar.	1.28 N	....	....	.....
Apr.	1.28½N	....	....	.....

B—bid. N—nominal.

Gasoline trading in 1,000-bbl. units. Quotations for basis grade U. S. Motor, 55-59 octane, deliverable from Exchange licensed storage in Houston-Galveston, Texas, area.

Crude oil trading in 2,000-bbl. units. Quotations for basis grade Oklahoma-Kansas, 36-36.9 gravity legally produced oil, deliverable from Exchange licensed storage in Houston-Galveston area and Cushing-Drumright, Oklahoma, area. Other grades of gasoline and crude deliverable subject to premiums and/or discounts as set forth in Exchange by-laws. Gasoline prices include 1-cent federal tax.

EXPORTS OF CARBON BLACK

Exports of carbon black in March were more than double those for March, 1934.

Kansas Wildcats

(Continued from Page 116)

Lario O. & G. Co.'s No. 1 State, SW cor. Sec. 29-15-8w.
Siliceous lime 2,991-3,003 ft.; hole full water.
Abd.

Western Exploration Co.'s No. 1 Wilkins, NW SW NW Sec. 9-17-9w.
Fishing 690 ft.

GREENWOOD COUNTY

Foster & Schultz's No. 1 Ferguson, C S½ NE SW Sec. 12-26-13.
Drlg. 1,225 ft.

Mullendore et al's No. 1 Pedroje, NE SW Sec. 14-23-11.
Drlg. 1,817 ft.

HARVEY COUNTY

Cameron, Derby Oil Co. and Trees' No. 1 Brainard, SW SE NW Sec. 19-24-2.
Drlg. 2,420 ft.

Goering Bros.' No. 1 Brainard, NE SW Sec. 3-23-2w.
Drlg. 920 ft.; (correction).

Hartman & Blair et al's No. 1 Redinger, NW cor. Sec. 15-24-3w.
Cellar.

D. R. Lauck et al's No. 1 Baller, SW cor. Sec. 29-24-1.
Drlg. 2,090 ft.

L. W. Prunty et al's No. 1 Davis, NE cor. Sec. 6-22-1w.
Chat 2,922 ft.; drlg. 2,928 ft.

Twin Drlg. Co. et al's (O. J. Connell), No. 1 Roth, SW cor. Sec. 16-22-2w.
Drlg. 2,750 ft.

Winkler Koch et al's No. 1 Mueller, SE SW NW Sec. 15-23-2w.
Spudded and S.D.

KINGMAN COUNTY

Derby et al's No. 1 Bartholomew, SW SW NW Sec. 8-27-4w.
Moving in material.

Gypsy Oil Co.'s No. 1 Tonn, SW NW SE Sec. 16-25-4w.
Drlg. 1,280 ft.

Kingman Oil Co.'s No. 1 Wetherall, NE NE SW Sec. 20-28-10w.
Rig.

Kingman Oil Co.'s No. 1 Wetherall, NE NE SW Sec. 20-28-10w.
S NE NE SW Sec. 20-28-10w.
Moving in material.

McPHERSON COUNTY

Brosius et al's No. 1 Hanson, NE NE SW Sec. 15-17-2w.
T.D. 1,108 ft.; S.D.

Carey & Miller's No. 1 Husband, SE SE NW Sec. 6-19-3w.
Moving in material.

W. C. McBride's No. 1 Mugler, SE SW SW Sec. 22-20-3w.
Chat 3,104 ft.; drlg. 3,250 ft.

Palmer Oil Corp.'s No. 1 Swenson, NE NE SW Sec. 11-18-3w.
Drlg. 3,105 ft.

Shell Pet. Corp.'s No. 1 Wenger, NE cor. Sec. 2-20-1w.
Viola 3,356-64 ft., T.D.; swbd. 255 bbls. in 10 hrs.; 50% wtr.; acidized; potential production 100 bbls. oil, 620 bbls. of wtr.; P.B. to 3,360 ft.

Stafford et al's No. 1 Krehbiel, NW NW SE Sec. 27-21-3w; (O.W.D.D.).
C.O. at 2,080 ft. and S.D.

NESS COUNTY

Phillips Pet. Co.'s No. 1 Young, C NW SW Sec. 13-18-21w.
H.F.W. 3,715-20 ft.; drlg. 3,825 ft.

OSAGE COUNTY

Jim Edwards' No. 1 Detrick, C NW SE Sec. 21-14-15.
Show oil and gas 783-800 ft.; T.D. 800 ft.

PAWNEE COUNTY

Atlantic Oil Prod. Co.'s No. 1 Siepake, C NE NE Sec. 15-23s-17w.
Simpson 4,150 ft.; coring 4,189 ft.

RENO COUNTY

Bradley's No. 1 Olmsted, SW SW SW Sec. 32-22-7w.
Moving in material.

Foraker et al's No. 1 Hiett, SE SW NE Sec. 34-24-4w.
T.D. 1,255 ft.; S.D.

Gypsy Oil Co.'s No. 1 Tonn, SW NW SE Sec. 16-25-4w.
Rig.

L. A. Mylius et al's No. 1 Sprowl, NE NW NE Sec. 1-24-5w.
Drlg. 2,760 ft.

Privett Drlg. Co.'s No. 1 Crotts, NE NW NE Sec. 27-26-10w.
S.D. 4,640 ft.

RICE COUNTY

Allison & Fitzwilliams et al's No. 1 Stumps, NW NW SW Sec. 4-18-10w.
Siliceous lime 3,299-61 ft., T.D.; acidized; 546 bbls. in 21 hrs.; completed.

Day et al's No. 1 Mason, NW NE NE Sec. 28-21-7w.
(Mystery well.)

Foraker, Nickerson et al's No. 1 Lyons, SE NW Sec. 27-20-8w.
Simpson 3,485 ft.; H.F.W. 3,500-11 ft.; Siliceous 3,559 ft.; T.D. 3,617 ft.; hole full of water; abd.

Fred Rust et al's No. 1 Brown, NE cor. Sec. 16-21-6w.
Rigged up.

Vickers Pet. Co. et al's No. 1 Gouldner, SE NE NW Sec. 16-18-9w.
Show of oil 2,665-70 ft.

ROOKS COUNTY

Smith & Ash's (Carman & Hershey) No. 1 Nelson, NW NW NE Sec. 27-10-16w.
S.D. at 50 ft.

Trees Oil Co. and Findeiss' No. 1 Johnson, SW SW SE Sec. 26-10-19w.
Drlg. 717 ft.

RUSH COUNTY

P. Boyle et al's No. 1 Yost, C SW SW Sec. 28-17-18w.
Drlg. 1,025 ft.

Eldorado Ref. Co.'s No. 1 Stang, SE NW Sec. 36-17-17w.
Drlg. 465 ft.

Lario O. & G. Co. and Phillips Pet. Co.'s No. 1 Benbow, NW NE NE Sec. 12-17-19w.
T.D. 3,790 ft.; fishing.

Morgan & Flynn's No. 1 Schlegel, SE SE NW Sec. 26-17-16w.
Drlg. 3,604 ft.

RUSSELL COUNTY

J. Brouk and R. D. Bailey's No. 1 Kleusner, NW SE Sec. 34-15-12w.
Rigged up.

Buffalo Oil Co.'s No. 1 Kuns, NE NE SW Sec. 19-14-15w.
Cellar.

Hartman & Blair's No. 1 Claussen, SE NE SW Sec. 34-12-14w.
Moving in material.

Hartman & Blair's No. 1 Hildebrandt, NW NE SW Sec. 12-14-14w (deepening from 3,352 ft.).
T.D. 3,345 ft.; S.D.

Hartman & Blair's No. 1 Rexroat, NE NW NW Sec. 31-14-14w.
Cellar.

Murphin et al's No. 1 Funk, SW cor. Sec. 19-12-13w.
Fishing at 3,040 ft.

Pryor and Lockhart's No. 1 Spicer, NE SE Sec. 21-11-15w.
Rigging up.

Reserve Pet. Co.'s No. 1 Moore, NW NW SW Sec. 15-13-12w.
Bldg. rig.

Ryan Pet. Co.'s No. 1 Newbold, NW SE NE Sec. 25-12-15w.
C.O. 2,875 ft.

Vernon & Murphin's No. 1 Becker, NE cor. Sec. 32-15-13w.
Drlg. 410 ft.

Wakefield & Armer's No. 1 Hall, NE SE SW Sec. 36-14-15w.
Drlg. 1,925 ft.

Winkler & Koch's No. 1 Herman, SE NW Sec. 27-12-15w.
Spud and S.D.

Wolf Creek Oil Co. et al's No. 1 Penn Mutual, SW cor. Sec. 22-15-15w.
8-in. set, 2,615 ft.

SEDGWICK COUNTY

Allison & Fitzwilliams et al's No. 1 Struthers, NE SW Sec. 34-28-2w.
T.D. 3,295 ft.; C.O.

Magnolia Pet. Co.'s No. 1 Bartholomew, SE SE SW Sec. 30-27-4w.
Chat 3,682 ft.; 9-in. 3,692 ft.; standardizing.

Western Kansas O. & R. Co.'s No. 1 Betzen, SE NE Sec. 17-26-3w.
S.D. 3,882 ft.

SCOTT COUNTY

Atlantic Oil Prod. Co.'s No. 1 Mark "A," C SE SE Sec. 28-20-33w.
Drlg. 3,558 ft.

STAFFORD COUNTY

C. B. Davis et al's No. 1 Riley, SE cor. Sec. 19-22-11w.
T.D. 232 ft.; waiting for pipe.

Empire O. & R. Co.'s No. 1 Grove, NE NE NW Sec. 5-22-11w.
Building rig.

Lario O. & G. Co.'s No. 1 Tudormorgan, SE SE NW Sec. 23-24-13w.
Increase in oil 3,620-25 ft.; 2,500 ft. of oil in hole in 4 hrs.

SUMNER COUNTY

Allison & Fitzwilliams et al's No. 1-B Hitchcock, SE NW Sec. 16-30-1w.
Cellar.

Shell Pet. Corp.'s No. 1 Green, SE SW NW Sec. 3-33-2.
Chat 3,173 ft.; show of oil 3,196-3,200 ft.; drlg. 3,235 ft.

Wakefield et al's No. 1 Newton, SE cor. Sec. 21-30-2.
Rig.

D. J. Wilson et al's No. 1 Clark, 1,320 ft. from W and 25 ft. from S line of NW Sec. 15-35-1w.
T.D. 350 ft.; U.R. 12-in. pipe.

TREGO COUNTY

Central Commercial's No. 1 Wagg, NW NW SE Sec. 17-13-21w.
T.D. 1,600 ft.; fishing.

Hansa & Lauck and Olson Drlg. Co.'s No. 1 Lang, SE SE NW Sec. 1-14-21w.
Rig.

Jenmar Oil Co.'s No. 1 Jones, SE cor. Sec. 20-12-23w.
Oswald lime 3,790 ft.; T.D. 3,890 ft.; small show oil and ⅛ bbl. wtr. per hr.; acidized; no increase; C.O. 3,954 ft.

WOODSON COUNTY

Foster and Schultz's No. 1 Ferguson, C S½ NE SW Sec. 12-26-13.
U.R. to 1,300 ft.

La.-Ark. Wildcats

(Continued from Page 118)

Sec. 7-20-15.
Set 7-in. 816 ft.

CALDWELL PARISH

Critchell & Woods' No. 1 Kraft, 230 ft. N and W, SE cor. NW NE Sec. 18-11-3e.
Set 10-in. 133 ft.

G. W. Zeigan et al's No. 1 La.-Central Lbr. Co., 175 ft. S and E, NW cor. SW SW Sec. 25-13-3e.
Rigging up.

CATAHOULA PARISH

Geo. J. Phillips' No. 1 La.-Central Lbr. Co., 127 ft. N, 2,490 ft. W, SE cor. Sec. 2-9-6e.
Set 7-in. 826 ft.

CLAIBORNE PARISH

E. T. Oakes' No. 1 H. W. Patton Est., 660 ft. S and W, NE cor. Sec. 1-20-5w.
Partly rigged up and S.D.

DESOTO PARISH

E. B. Bird et al's No. 1 J. H. Johns, 330 ft. N and W, center Sec. 30-14-6.
Set 6-in. 2,610 ft.; T.D. 2,630 ft.

W. T. Coleman's No. 1 Walker, 330 ft. N, 660 ft. W, SE cor. SE SW Sec. 18-12-11.
Rigging up.

DeSoto Pet. Co.'s No. 1 B. Y. Wemple, C S½ SE NE SW Sec. 14-12-11.
Arranging to set csg. 2,590 ft.

D. J. Flesh et al's No. 1 Farmer, 660 ft. S, 610 ft. E, NW cor. SE NE Sec. 14-12-13.
Drlg. 280 ft.

E. L. Foster's No. 1 Youngblood, Sec. 9-11-14.
S.D. 2,691 ft.

P. G. Fraley et al's No. 1 G. R. Stell, 330 ft. S and W, NE cor. Sec. 5-12-16.
Rigging up.

Leslie Prod. Co.'s No. 1 Ramsey, 150 ft. N and W of C Sec. 36-11-11.
Set 10-in. 45 ft.

National Oils, Inc.'s No. 1 B. Y. Wemple, NW SW Sec. 14-12-11.
S.D. 120 ft.

Ed Telford et al's No. 1 Thigpen, 400 ft. S, and 308 ft. W, NE cor. SW NE Sec. 33-13-13.
Set 10-in. 105 ft.; drlg. 910 ft.

EAST CARROLL PARISH

Century Oil & Drlg. Co.'s No. 1 Olive Dell, 660 ft. S, 300 ft. W, NE cor. Sec. 56-21-21e.
Set 10-in. 280 ft.

O. G. Collins' No. 1 H. L. Hunt, approx. center of Sec. 26-22-13e.
Rigging up.

GRANT PARISH

C. & S. Oil Corp.'s No. 1 Swope, Sec. 17-19-1e.
Coring 1,608 ft.

MADISON PARISH

Frazier et al's No. 1 Frazier, 330 ft. S and E, NW cor. SE SE Sec. 23-17-10e.
D.S. stuck; abd. 3,070 ft.

MOREHOUSE PARISH

Alex Rice, tr.'s No. 1 Myers, Sec. 15-22-7.
Drlg. 2,500 ft.

OUACHITA PARISH

J. E. Farrell's No. 3 State of La., Sec. 21-20-4e.
Comp.; 10,000,000 ft. of gas, 2,140 ft.

J. E. Farrell's No. 2 State of La., Sec. 51-20-4e.
Set 12½-in. 60 ft.; set 8-in. 163 ft.

NATCHITOCHES PARISH

Clyde Crichton's No. 1 Friedman Est., 406 ft. N, 428 ft. E, SW cor. Sec. 52-7-6.
Arranging test, 2,243 ft.

Ab Jones' No. 1 Brown Lbr. Co., 400 ft. N, 330 ft. W, SE cor. Sec. 5-10-10.
Washing to bottom 1,033 ft.

RAPIDES PARISH

Williams-Carroll & Day's No. 1 Armstrong & Murphy, 286 ft. N, 300 ft. W, SE cor. Sec. 24-5n-1w.
Dry and abd. 2,418 ft.

RED RIVER PARISH

Sterling O. & R. Co.'s No. 1 Long Bell, Sec. 19-13-9.
S.D. 2,946 ft.

J. S. Tuffree's No. 1 Wilkinson, 1,320 ft. S and W, NE cor. Sec. 11-12-11.
S.D. 1,395 ft.

SABINE PARISH

M. T. Hines' No. 1 J. B. Hill, SW NE Sec. 4-6-11.
S.D. 2,240 ft.

Laurel Pet. Co.'s No. 1 Long Bell Lbr. Co., 330 ft. N and E, SW cor. Sec. 14-8-14.
Set 8-in. 1,791 ft.

Lawson-Leavell & Bryant's No. 4 Bank of P. H., 330 ft. S and W, NE cor. NW NE Sec. 29-9-13.
P.B. to 1,935 ft.; old T.D. 2,012 ft.

Jack Lent's No. 1 Williams, Sec. 13-7-11.
S.D. 950 ft.

Strickland et al's No. 1 Whitney Corp., Sec. 32-10-12.
Recmt. 8-in.; T.D. 1,590 ft.

Windsor Oil Co.'s No. 2 Bank of P. H., 330 ft. S and E, NW cor. NE NE Sec. 29-9-13.
Set 10-in. 42 ft.; set 7-in. 1,508 ft.

UNION PARISH

Carbon Consolidated's No. 1 Hollis, 946 ft. N, 1,056 ft. E, SW cor. SE Sec. 10-21-3e.
Comp.; 1,500,000 ft. gas, 2,199 ft.

Southern Carbon Co.'s No. 67 fee, 1,980 ft. S, 750 ft. E, NW cor. Sec. 5-20-4e.
Drlg. 2,070 ft.

WEBSTER PARISH

Virgil Likens' No. 1 E. L. Stewart, 1,020 ft. E, 600 ft. S of NW cor. Sec. 23-18-10.
Junked hole; skidding over; old T.D. 2,017 ft.

ARKANSAS

ASHLEY COUNTY

Glenn E. McFaddin et al's No. 1 Boreine Farms, 660 ft. S and W, NE cor. Sec. 1-18-8.
D.S. stuck 2,800 ft.

COLUMBIA COUNTY

Gold Oil Corp.'s No. 1 Weffer, 330 ft. N and E, SW cor. SE NW Sec. 24-15-20.
Set 12½-in. 42 ft.

Southern States Gas Co.'s No. 1 Piney Woods Lbr. Co., 330 ft. N and E, SW cor. NE NW Sec. 10-20-22.
S.D. 960 ft.

O. F. Whittaker's No. 1 F. Hall, 330 ft. N and W, SE cor. SE NW Sec. 11-15-20.
Fishing for D.S. 1,612 ft.

HEMPSTEAD COUNTY

A. H. Bagnelle's No. 1 Trattner & Rhinehart, Sec. 2-13-26.
S.D. 1,992 ft.

F. W. Martin's No. 2 Lafferty, C NW Sec. 17-14-24.
Rigging up.

LAFAYETTE COUNTY

Kamon & Neely's No. 1 Cockran, NW cor. SE SW Sec. 26-19-25.
Coring 3,350 ft.

Larry Romine's No. 1 Nolte, NE cor. NE NW Sec. 11-19-26.
Set 10-in. 80 ft.

Riggs Bros.' No. 1 Dubose, SE cor. SW NW Sec. 35-15-24.
S.D. 2,600 ft.

LONOKE COUNTY

J. G. Strahan's No. 1 Hardin, Sec. 18-2s-7w.
S.D. 1,780 ft.

MILLER COUNTY

M. D. K. Fitzwater's No. 1 E. H. Beck, 150 ft. N and E, SW cor. NW SW Sec. 34-15-26.
Junked hole; skidding over from 2,915 ft.

Fitzwater et al's No. 1 Norson, SW cor. SE SW Sec. 20-15-27.
S.D. 3,177 ft.

King Oil Corp.'s No. 1 C. H. Schroder, 200 ft. N, 330 ft. E, SW cor. SW NE Sec. 24-14-28.
S.D. 3,167 ft.

King Oil Corp.'s No. 1 Anderson, 350 ft. E, 200 ft. S, NE cor. SW NE Sec. 16-14-27.
D.S. test dry at 2,213 ft.; coring ahead.

Magnolia Pet. Co.'s No. 8 Olivet, 336 ft. S and W, NE cor. NW NW Sec. 3-16-26.
Rigging up.

A. C. Roan's No. 1 Frost Est., 150 ft. N and W, SE cor. SE SW Sec. 8-15-26.
Set 10-in. 120 ft.

Lee Timberlake's No. 1 Frost Est., 330 ft. N and E, SW cor. SW SE Sec. 27-15-26.
S.D. 3,100 ft.

NEVADA COUNTY

Carnett et al's No. 1 Floyd Munin, C SW Sec. 16-14-22.
S.D. 50 ft.

OUACHITA COUNTY

F. A. Book et al's No. 1 Arnold, Sec. 24-15-16.
S.D. 2,032 ft.

Chas. Steele et al's No. 1 Myar Est., 330 ft. N and W, SE cor. SW SE Sec. 16-13-18.
S.D. 50 ft.

SEVIER COUNTY

Pendleton & Vaughn's No. 1 Harrison Est., 265 ft. S, 30 ft. W, CEL Sec. 34-9-30.
Drlg. by lost bit at 1,171 ft.

UNION COUNTY

J. E. Crosbie, Inc.'s No. 1 Warren, 330 ft. S and W, NE cor. SW SW Sec. 10-17-14.
P.B. to 3,337 ft.; old T.D. 3,342 ft.

Gardy Drlg. Co.'s No. 1 Craig, Sec. 35-17-15.
S.D.; W.O. 2,211 ft.

Gulf. Ref. Co.'s No. 49 L. Werner, 4,620 ft. N, 60 ft. E, SW cor. Sec. 5-16-16.
Drlg. 5,650 ft.

H. L. Hunt's No. 15 E. F. Gregory, 330 ft. N and W, SE cor. Sec. 10-17-14.
Perforating csg. at 3,428-53 ft.; tested S.W.

H. L. Hunt, Inc.'s No. 16 J. D. Gregory Estate, 330 ft. S and W, NE cor. SE SW Sec. 10-17-14.
Set 7-in. 3,379 ft.

H. L. Hunt's No. 18 E. F. Gregory, 330 ft. N and E, SW cor. Sec. 11-17-14.
Derrick.

Mrs. R. K. Jones et al's No. 1 Davis, 330 ft. N and W, SE cor. NW NW Sec. 28-16-14.
Drilled plug 2,000 ft.; S.W. in hole 2,765 ft.

Marine Oil Co.'s No. 4-E Thompson, 330 ft. S and W, NE cor. NW NE Sec. 10-12-13. Comp.; pumping 150 bbls., 3,583 ft.
Joe Modisette et al's No. 1 D. S. Sturdevant, 330 ft. N and W, SE cor. Sec. 6-12-13. Drlg. 4,016 ft.
C. E. Murdock's No. 1 Pumphrey, C SW NW NE Sec. 11-17-14. Derrick.
Earl Patterson's No. 1 C. L. Smith, 1,130 ft. S, 550 ft. E, NW cor. Sec. 29-17-14. Flowed 100 bbls. and sanded up; 2,902 ft.

MISSISSIPPI
AMITE COUNTY

Mineral Resources, Inc.'s No. 1 Anderson, C NE NW Sec. 14-3n-3e. S.D. 550 ft.

BOLIVAR COUNTY

White & Jones' No. 1 Ballou, SE SE NW Sec. 17-24n-7w. S.D. 20 ft.

CLARKE COUNTY

L. Beckwith et al's No. 1 Long Bell Lbr. Co., 538 ft. S, 125 ft. W of C Sec. 10-2n-16e. T.A.; lack of funds.
Clarke County Oil Co.'s No. 1 Dora Butler, C SW SW Sec. 15-2n-16e. Set 10-in. 63 ft.

HARRISON COUNTY

Big Ridge Oil Co.'s No. 1 Hinzin, NE Sec. 12-7s-10w. S.D.; W.O. 1,100 ft.

HINDS COUNTY

F. H. Robertson et al's No. 1 Martin, 660 ft. E, 330 ft. N, SW cor. N½ SW NE Sec. 26-6n-1e. Set 10-in. 681 ft.; drlg. 1,050 ft.
Bob Weaver's No. 1 T. Russell & Oparka, C NW NW NE Sec. 26-6n-1e. Drlg. 300 ft.

JONES COUNTY

Snow-Black Pet. Co.'s No. 1 Fox, 400 ft. N, 750 ft. W, SE cor. SE SW Sec. 30-7n-12w. T.A. 4,050 ft.

LAUDERDALE COUNTY

Bob Dalton's No. 1 Bounds, Sec. 34-7n-15e. S.D.; W.O. 1,600 ft.

MONROE COUNTY

P. J. McAlpine's No. 1 Frank Rye, Sec. 15-15s-17w. T.A. 2,931 ft.
P. J. McAlpine's No. 1 Crook, 1,090 ft. S, 90 ft. W, NE cor. Sec. 15-13s-13w. Drlg. 2,484 ft.

RANKIN COUNTY

Cleve Love et al's No. 1 Boehle, 150 ft. S and W, NE cor. NW NE Sec. 18-5n-2e. Set 7-in. 2,442 ft.

SIMPSON COUNTY

Berry Corp.'s No. 2 R. T. Berry, Sec. 33-2n-4e. O.W.D.D.; S.D. for fuel at 2,510 ft.

WALTHALL COUNTY

Mutual O. & G. Co.'s No. 1 Boyd, SW cor. SW SE Sec. 24-2n-9e. Partly rigged up and S.D.

WARREN COUNTY

H. W. Elliott et al's No. 2 R. L. Parker, 780 ft. E, 1,570 ft. S, NW cor. Sec. 14-14n-1e. S.D.; high wtr. 1,600 ft.

WASHINGTON COUNTY

Perkins & Dees' No. 1 Lee, 1,500 ft. E, 500 ft. N, SW cor. Sec. 33-15n-3w. Set 10-in. 300 ft. and S.D.

WINSTON COUNTY

Jack Vale et al's No. 1 Moody, 713 ft. N, 667 ft. E, SW cor. NW SW Sec. 3-13n-14e. S.D.; W.O. 1,320 ft.

La.-Ark. Proven Fields

NORTH LOUISIANA
CADDO—RODESSA

United Gas Public Service Co.'s No. 2 Caddo Levee Board, 1,126 ft. S, 25 ft. E. NW cor. Sec. 26-23-16. Rigging up.
United Gas Public Service Co.'s No. 1 I. L. Young, C E½ SE Sec. 21-23-16. Set 10¼-in. 2,100 ft.
United Gas Pub. Ser. Co.'s No. 1 Johnson Unit, 1,245 ft. S, 1,365 ft. W, NE cor. Sec. 26-23-16. Drlg. 5,816 ft.

SABINE PARISH—ZWOLLE

Alexander & Crane's No. 1 Fogman, SE cor. N½ SW NE Sec. 18-7-11. Set 6-in. 2,373 ft.
Ivan A. Allen's No. 1 La. Long Leaf, 330 ft. N and W, SE cor. NW SE Sec. 12-7-11. S.D. 2,120 ft.
Hunter Co.'s No. 15 Sabine Lbr., 2,640 ft. E, 1,320 ft. N, SW cor. Sec. 1-7-12. Set 10-in. 64 ft.
H. C. Maulding's No. 1 Davis, 350 ft. N and W, SE cor. NE NE Sec. 2-7-11. Rigging up.
K. C. Peterson et al's No. 1 Bowman-Hicks, 330 ft. S and E, NW cor. SW NW Sec. 3-7-9. Derrick down.
Tex.-La.-Ark. Oil Co.'s No. 1 Pickering Lbr. Co., Sec. 3-3-12. S.D. 2,742 ft.

EAST TEXAS (BORDER COUNTIES)
HARRISON COUNTY

R. C. Payne et al's No. 1 Lowery, H. D. Spain Sur. P.B. to 2,524 ft.

MARION COUNTY

Ed S. Holman's No. 1 Henderson, R. Bennington Sur. P.B. to 2,443 ft.

PANOLA COUNTY

R. A. Graddy's No. 1 M. J. McCormick, J. McAdams Sur. Moving in rig.
George Hudson et al's No. 1 J. F. Nail, C. McGeary Sur. Set 8-in. 40 ft.; fishing for core bbl. at 2,345 ft.
Geo. Le Grand's No. 1 P. J. Wardleigh, A. Thompson Sur. Set 10-in. 62 ft.
R. W. Price's No. 1 Crawford, J. A. Williams Sur. Set 10-in. 64 ft.
Fred Stovall Drlg. Co.'s No. 1 H. D. Ivey, P. Martin H.R.S. S.D. for csg. 1,980 ft.

SHELBY COUNTY

Cliff Stoval's No. 1 Pickering Lbr. Co., C. H. Patterson Sur. S.D.; rig repair. 1,485 ft.
O. P. Bush, trustee's No. 1 Pickering Lbr. Co., P. W. Harvey Sur. S.D. 730 ft.

ALABAMA
COVINGTON COUNTY

Geometer Prod. Corp.'s No. 1 Culbreath, SW cor. SW NE Sec. 8-2n-14e. S.D.; repairing rig. 5,600 ft.

HOUSTON COUNTY

Rice O. & G. Co.'s No. 1 Oakley est., SE cor. NW SW Sec. 9-3n-29e. S.D.; W.O. 2,506 ft.

LAMAR COUNTY

DeSoto O. & G. Corp.'s No. 1 Gardner, Sec. 22-15s-16w. Drlg. lime 4,200 ft.

WALTON COUNTY—FLORIDA

Geometer Oil Corp.'s No. 2 Walton Land & Timber Co., Sec. 10-1s-19w. Drlg. core tests on block; R.U. and S.D.

Gulf Coast Wildcats

(Continued from Page 106)

Abd. 528 ft.
Intercoastal Oil Co.'s No. 13 Wisdom, 150 ft. from NW line and 10 ft. from SW line of Lot "D", Blk. No. 51. S.D. 2,600 ft.
Gail Whitcomb's No. 1 Wisdom, 300 ft. NE from Shell Pet. Corp.'s No. 4 Allen, A. Darst League. Drlg. 480 ft.

HASTINGS—BRAZORIA COUNTY

Stanolind O. & G. Co.'s No. 1 Williams, 466 ft. N, 1,126 ft. from most easterly SW cor. of 81.3-ac. lease, A.C.H.&B. Sur. No. 1. Drlg. sandy shale 1,680 ft.
Stanolind O. & G. Co.'s No. 1 Grote, 460 ft. N and W of SE cor. of 71-ac. lease, A.C.H.&B. Sur. Drlg. shale 3,200 ft.
Stanolind O. & G. Co.'s No. 1 Sneed, 495 ft. E along S line of Miller lease from SW cor. and 466 ft. S at R/A, A.C.H.&B. Sur. No. 2. Drlg. sandy shale 5,225 ft.
Stanolind O. & G. Co.'s No. 2 Sneed, 491.5 ft. E, and 1,590 ft. S from NW cor. of Gilbert Sneed 225-ac. lease, A.C.H.&B. Sur. No. 2. Drlg. shale 3,520 ft.
Stanolind O. & G. Co.'s No. 2, J. W. Surface, 375 ft. S and 466 ft. W from easterly NE cor. of 75.9-ac. lease, A.C.H.&B. Sur. No. 2. Drlg. shale 1,645 ft.

MANVEL—BRAZORIA COUNTY

Jay Simmons' No. 1 Stitt, located in center of W 5 acres of Lot No. 28, H.T.&B. Sur. No. 23. T.D. 4,008 ft.; 7-in. csg. 3,990 ft.
Harrison & Abercrombie's No. 1 Stevens et al, Center of W 5 acres, E of No. 4, A.C.H. &B. Sur. No. 91. Drlg. shale and lime 3,750 ft.
Commonwealth Oil Co.'s No. 1 Nichols, 150 ft. out of E cor. of Lot No. 2, H. N. Little Sur. Top oil sand 4,002 ft.; T.D. 4,062 ft.; 7-in. 3,990 ft.; I.P. 200 bbls. through ¼-in. choke.
Texas Co.'s No. 2 Gulf Coast Home Co., 347 ft. S, 441 ft. W from NE cor. of Lot 88, H.T.&B. Sur. No. 2-B. Rigging up.
J. W. Sorrells' No. 1 Swift, Blk. 21, Abst. 318, H. N. Little Sur. Derrick.
Texas Co.'s No. 10 Houston Oil Field Assn., 419.5 ft. S, 47 deg., 59 ft. E and 263 ft. N 42 deg., 1 ft. E of W cor. of Lot No. 7, A.C.H.&B. Sur. 10-in. csg. 1,108 ft.; drlg. gumbo 1,150 ft.
Texas Co.'s No. 8-A Belcher, 330 ft. S, 47 deg. 59 ft. E and 265 ft. S 41 deg. 40 ft. W of NE cor. of lease, H. N. Little Sur. 10-in. csg. 1,119 ft.; drlg. sand 3,750 ft.
Texas Co.'s No. 2 C. P. Dawson, 247.5 ft. S, 449.9 ft. W of NE cor. Lot No. 58, H. T.&B. Sur. No. 23. Drlg. shale and lime 3,550 ft.
Texas Co.'s No. 14-B Belcher, 660 ft. S 42 deg. W from No. 9-B Belcher, H. N. Little Sur. Location.
Texas Co.'s No. 1 O. W. Halligan, center of Lot 27, H.T.&B. Sur. No. 23. Location.
Texas Co.'s No. 1 O. W. Halligan, center of Lot 26, H.T.&B. Sur. No. 23. Location.
Texas Co.'s No. 3 O. L. Rash, 920 ft. S, 48 deg. E and 330 ft. S, 42 deg. W from N cor. of Lot No. 22, T. Spraggin Sur. Rig up.
Texas Co.'s No. 2-A H. J. Wray, 330 ft. from N line and 990 ft. W of E line of lease. T.D. 5,154 ft.; 7-in. csg. 5,130 ft.
Texas Co.'s No. 4 A.R.G.G.H., 442 ft. W and 247.5 ft. S of NE cor. Lot 36, H.T.&B. Drlg. sandy shale and lime 5,163 ft.
Texas Co.'s No. 11-A Belcher, 990 ft. W and 330 ft. N of SE cor. of H. N. Little Sur. 7-in. csg. 5,655 ft.; T.D. 5,675 ft.; I.P. 620 bbls. per day through ¼-in. choke; T.P. 700 lbs.; C.P. 800 lbs.
Texas Co.'s No. 1 C. P. Dawson, 2,475 ft. S, 441.9 ft. W of NE cor. of Lot 59, H.T.&B. Sur. No. 23. T.D. 5,645 ft.; 7-in. csg. 5,627 ft.; waiting on orders.
Texas Co.'s No. 17 Houston Oil Fields Assn., 244 ft. S, 244 ft. W from NE cor. of Lot 1, A.C.H.&B. Sur. No. 91. Location.
Texas Co.'s No. 16 Houston Oil Fields Assn., 247 ft. S, 440 ft. E from NW cor. of Lot 19, A.C.H.&B. Sur. No. 91. Location.
Texas Co.'s No. 2 Dawson, 247 ft. S, 241 ft. W of NE cor. of Lot 58, H.T.&B. Sur. No. 23. Location.
Trumba Oil Co.'s (J. M. Campbell) No. 1 H. McCauley, 150 ft. each way out of NE cor. of W 5 acres of Lot No. 2, A.C. H.&B. Sur. No. 91. Location.
Turnbull & Irwin's No. 1 Hart, center of Lot 10, H.T.&B. Sur. No. 24. Drlg. shale 4,550 ft.
Whittle Oil Co.'s No. 1 Duke, 320 ft. W of E line, center N and S Lot 18, H.T.&B. Sur. No. 23. Spudded.

OLD OCEAN—BRAZORIA COUNTY

Harrison & Abercrombie's No. 2 Bernard River, 1,000 ft. N, 54 deg. W, 400 ft. S, 36 deg. W of No. 1, Charles Breen Sur. Location.

PLEDGER—BRAZORIA COUNTY

Humble O. & R. Co.'s No. 1 T. L. Smith, 1,283 ft. NE from W cor. of 88.86-ac. lease, thence 887 ft. SE at R/A. D. McNeel Sur. Drlg. shale 3,770 ft.

PORT LAVACA—CALHOUN COUNTY

Adrian Moore et al's No. 1 O. F. McMaster, 330 ft. out of SE cor. of 80-ac. tract, M. Sanches Sur. Location.
Halliburton Oil Prod. Co.'s No. 1 Bruton 660 ft. due E of Steinberger Pet. Co.'s No. 1 Ishofner, M. Sanches Sur. 13-in. csg. 490 ft.; coring sand and sandy shale 6,155 ft.; odor of oil.
Texas Co.'s No. 1 Shofner, SE offset to Steinberger's No. 1 Shofner, M. Sanches Sur. Location.
Texas Co.'s No. 1 I. Biardone, 1,650 ft. from E line and 1,350 ft. from N line of lease, Samuel Shupe Sur. Coring shale 6,365 ft.
Texas Co.'s No. 1 R. Duelberg, 1,565 ft. NE along S line from SW cor. of lease and 390 ft. N at R/A, M. Sanches Sur. Coring ahead 6,276 ft.; tried to make drill stem test from 6,256-75 ft.
Texas Co.'s No. 1 J. A. Marten, 1,700 ft. SW along N line from NE cor. and 1,400 ft. at R/A in SE direction, Florentina Garcia League Sur. Coring sand showing oil 6,246 ft.
Texas Co.'s No. 1 H. C. Wehmeyer, 900 ft. NW along W line from upper SW cor of lease, and at R/A NE 1,213 ft., M. Sanches Sur. T.D. 6,333 ft.; P.B. 6,261 ft.; 7-in. csg. 6,249 ft.; prepare to drill plug.
Tulane Gordon's No. 1 W. A. Shofner, 339.5 ft. from N line, 295 ft. from E line of block, D. Tilley Addn., M. Sanches Sur. Location.

ANAHUAC—CHAMBERS COUNTY

Humble O. & R. Co.'s No. 3 Middleton, 2,332 ft. N of S line, 2,333 ft. E of W line of Sec. 58, H.&T.C. Sur. Derrick.
Humble O. & R. Co.'s No. 1 Broussard, 466 ft. from W line, 466 ft. from N line, Sec. 63, H.&T.C. Sur. T.D. 7,100 ft.; 7-in. csg. cmtd. 7,070 ft.; drlg. plug.
Humble O. & R. Co.'s No. 2 Middleton, 466 ft. out of NE cor. of H.&T.C. Sur., Sec. 64. Derrick.

BARRERS HILL—CHAMBERS COUNTY

McAlbert Oil Co.'s No. 3-B Hegging, 50 ft. S of N line and 50 ft. E of W line. Top sand 4,553 ft.; T.D. 4,632 ft.; 7⅝-in. csg. 4,622 ft.
Mills Bennett Prod. Co.'s No. 3-C Barber, 93 ft. N of No. 1, 100 ft. E of W line. Drlg. salt 2,090 ft.
Sun Oil Co.'s No. 1 Higgins, 50 ft. S of N line, 50 ft. W of E line. Drlg. rock 1,257 ft.
Sun Oil Co.'s No. 11 Chambers County, half way between and in line with Nos. 9 and 10. T.D. 1,990 ft.; P.B. and sidetracked; drlg. salt 1,043 ft.
Texas Gulf Prod. Co.'s No. 6 Wilburn, 50 ft. N of S line, 25 ft. E of W line, William Hodges Sur. 18⅝-in. csg. 1,004 ft.
Texas Gulf Prod. Co.'s No. 3 Fitz, 450 ft. E of W line, 75 ft. N of S line. Drlg. shale 3,642 ft.
Texas Gulf Prod. Co.'s No. 13-A Kirby, 613 ft. N of S line, 85 ft. W of E line, W of Humble O. & R. Co.'s No. 8-B Kirby. Drlg. salt 4,422 ft.
Texas Gulf Prod. Co.'s No. 2 Fitz-Meadows, 281 ft. S of N line, 50 ft. W of E line of T. S. Fitz lot. Drlg. salt 3,221 ft.
Yount Lee Oil Co.'s No. 28 Chambers County, 50 ft. N of S line, direct offset to Sun's No. 10 Chambers County, Wm. Bloodgood Sur. Pulled tubing; drlg. 4,388 ft.
Yount Lee Oil Co.'s No. 30 Chambers County School Land, 50 ft. N of S line, direct offset to Sun Oil Co.'s No. 11. Derrick.

LOST LAKE—CHAMBERS COUNTY

Pure Oil Co.'s No. 19 Mays, 400 ft. SE of No. 11, 400 ft. SW of No. 14, E. H. R. Wallace Sur. 10¾-in. csg. 2,500 ft.

BIG CREEK—FORT BEND COUNTY

Trans-State Oil Co.'s No. 2 Ahlers, 85 ft. N of Gulf Stream, Inc.'s No. 1 Ahlers, Michael Young Sur. T.D. 2,685 ft.; 7-in. csg. 2,636 ft.; I.P. 300 bbls. per day through ⅝-in. choke.

BOLING—FORT BEND COUNTY

Irwin Larsen et al's No. 1 J. R. Farmer, 100 ft. NW and 100 ft. SW from E cor. of 125-ac. lease, James Scott Sur. Location.
Midland Oil Co.'s No. 1 P. F. Coulter, 150 ft. from S line, 4,174 ft. from W line of 100-ac. tract, Miller League No. 2. Set screen; T.D. 4,186 ft.
Navarro Oil Co.'s No. 2 H. R. Farmer, 361 ft. from SW line and 160 ft. from SE line of Humble O. & R. Co.'s lease, James Scott Sur. Drlg. shale and lime 3,720 ft.
Sun Oil Co.'s No. 1 H. R. Farmer, 103 ft. from N line, 359.2 ft. from W line of 100-ac. tract, James Scott League Sur. Derrick.
Yew Development Co.'s No. 1 C. E. Farmer, 600 ft. S and 325 ft. W of the NE cor. of 50-ac. lease, James Scott Sur. Rig up.

ORCHARD—FORT BEND COUNTY

Gulf Prod. Co.'s No. 42 Moore, 345 ft. S, 305 ft. W of SW cor. of E.M.G. Co. Sur. Drlg. shale 2,567 ft.
Gulf Prod. Co.'s No. 43 Moore, 350 ft. E along S line of SW cor. of E.M.&G. Co. Sur. and 740 ft. N at R/A to said line of lease, 350 ft. E of No. 3 Moore. Drlg. lime 4,669 ft.

THOMPSON—FORT BEND COUNTY

Gulf Prod. Co.'s No. 9 Hammerstram, S. Kennedy Sur. Location.
Gulf Prod. Co.'s No. 10 Hammerstram, S. Kennedy Sur. Derrick.
Gulf Prod. Co.'s No. 11 Gubbels. Drlg. shale 1,264 ft.
Gulf Prod. Co.'s No. 2 S. B. Gehr, 340 ft. from S line, 571 ft. E from Gulf Prod. Co.'s No. 1 S. B. Gehr, S. Kennedy Sur. T.D. 5,390 ft.; I.P. 155 bbls. per day.
Gulf Prod. Co.'s No. 108 Phoenix. Drlg. gumbo.
Humble O. & R. Co.'s No. 25-A Booth. Derrick.
Humble O. & R. Co.'s No. 12 Booth, 281 ft. from N line of lease, 1,550 ft. W of No. 11, John Rabb Sur. Abd. 5,417 ft.

HIGH ISLAND—GALVESTON COUNTY

Yount Lee Oil Co.'s No. 46 Cade, 424 ft. SW of No. 35, 424 ft. NW of No. 34, Fitzsimmons Sur. Rig up.
Yount Lee Oil Co.'s No. 1 Taylor, D. Dunman Sur., 125 ft. due E of No. 1-A Gordon-Viterbo. Location.
Yount Lee Oil Co.'s No. 24 Cade. T.D. 6,063 ft.; cutting and pulling liner.
Yount Lee Oil Co.'s No. 16 Smith. T.D. 5,922 ft.; P.B. 5,550 ft.; set whipstock 5,543-50 ft.
Yount Lee Oil Co.'s No. 1 Acon & Hughes, 85 ft. E of No. 1 Pabst, on a 3.52-ac. tract, M. Dunman Sur. Rig up.
Yount Lee Oil Co.'s No. 1-A Lockhart, 85 ft. W of No. 1 Pabste, on a 5.28-ac. tract, M. Dunman Sur. Coring shale 4,410 ft.
Yount Lee Oil Co.'s No. 1-A Gordon-Viterbo, 122 ft. E of W line, 326 Ft. S of N line of Lot 1, Martin Dunman Sur. Top sand 4,368 ft.; 7⅝-in. csg. 4,369 ft.; T.D. 4,393 ft.; I.P. 480 bbls. per day through ¼-in. choke.
Yount Lee Oil Co.'s No. 1 Loustalbot, 300 ft. from N line, 121 ft. from E line of Lot No. 3, offset to No. 2 Stewart, Martin Dunman Sur. T.D. 4,095 ft.; to P.B. to 3,650 ft.; drilled to 3,759 ft.; P.B. 3,636 ft.

DICKINSON—GALVESTON COUNTY

Humble O. & R. Co.'s No. 1 Fugger, 333 ft. from W line, 522 ft. from N line of lease, J. S. Sherman Sur. 10¾-in. csg. 1,981 ft.; drlg. shale 3,130 ft.
Humble O. & R. Co.'s No. 1 Townes, 440 ft. E of W line, 550 ft. N of N bank of Bayou, B.B.B.&C. Sur. Derrick.
Humble O. & R. Co.'s No. 2-A Maco Stewart, 3,324 ft. S along E line of S bank of Bayou and 566 ft. W of E line at R/A John Sellers Sur. 13⅝-in. csg. 1,882 ft.; drlg. shale 4,110 ft.
Stanolind O. & G. Co.'s No. 1 State, 247 varas S of Humble O. & R. Co.'s No. 1 Jones. Rig up.
Turnbull & Irwin's No. 1 J. Piazza, 460 ft. W and 250 ft. S of Humble O. & R. Co.'s No. 1 Jones, J. S. Sherman Sur. Coring 7,970 ft.

ARRIOLA—HARDIN COUNTY

Houston Oil Co.'s No. 8 fee, Arriola Sur. Drlg. shale 3,050 ft.
Houston Oil Co.'s No. 11 fee. Abd. 4,210 ft.
Houston Oil Co.'s No. 6-X fee, 400 ft. SE of No. 4-X, 500 ft. SE of No. 5-X fee. Drlg. sand 3,507 ft.
Republic Prod. Co.'s No. 11 fee, E. Arriola Sur. Tested S.W.; T.D. 3,842 ft.; waiting orders.

BATSON—HARDIN COUNTY

Danciger Oil & Refining Co.'s No. 1 Tom Wynne, 250 ft. S, 150 ft. W of Deering's No. 1 Cruse. Drlg. shale 3,210 ft.
Sterling O. & R. Co.'s No. 1 Doucette, 565 ft. N from NE cor. of Nunn tract thence 565 ft. E at R/A, Wm. Donoho Sur. T.D. 5,914 ft.; P.B. 5,678 ft.
John Deering's No. 1 Bullock, 1,000 ft. N. 17 ft. E of middle line of 30-ac. tract, Bullock tract, Dondo Sur. Drlg. hard sand 5,710 ft.
John Deering's No. 2 Cruse, 200 ft. E and 50 ft. S of No. 1 Cruse, W. Donaho Sur. Rig up.
John Deering's No. 3 Hooks, 200 ft. E of Cruse and Hooks' dividing line and 50 ft. S of straight line from No. 1 Cruse and No. 2 Hooks, W. Donoho Sur. T.D. 5,642 ft.; 7-in. csg. 5,575 ft.; I.P. est. 2,000 bbls. per day through ½-in. choke; T.P. 650 lbs.

SARATOGA—HARDIN COUNTY

Rio Bravo Oil Co.'s No. 11-N Jordit, 300 ft. due W of No. 11-R Jordit. Clearing location.

SOUR LAKE—HARDIN COUNTY

Arlis Pet. Co.'s No. 1 Harkan and Langham.

Dig pits.
Texas Co.'s No. 320 fee, S 89 deg., W, 117 ft. from No. 274.
T.D. 1,957 ft.; surveying hole.

HUMBLE—HARRIS COUNTY

Sun Oil Co.'s No. 84 River, 300 ft. E of No. 61, in 292-ac. tract, Robert Dunman Sur.
Location.
Sun Oil Co.'s No. 74 River, 275 ft. E of No. 73 in 292-ac. tract, Robert Dunman Sur.
T.D. 1,231 ft.; 7-in. csg. 1,215 ft.
Sun Oil Co.'s No. 29 Bender.
Drlg. sandy shale 3,325 ft.
Texas Co.'s No. 31 Humble, 300 ft. due south of No. 28.
Drlg. shale and lime 2,973 ft.

PIERCE JUNCTION—HARRIS COUNTY

Gulf Prod. Co.'s No. 39 Taylor, 1,729 ft. S, 75 ft. W of NE cor. of J. Hampton Sur.
Drlg. sand 6,249 ft.
Gulf Prod. Co.'s No. 21 Taylor.
T.D. 3,894 ft.; I.P. 100 bbls. per day pumping.
Hamil & Smith's No. 1 House, J. Hamilton Sur.
Top sand 6,482 ft.; T.D. 6,486 ft.; cmtd. 4½-in. csg. at 6,306 ft.; I.P. 17 bbls. per hour through ¼-in. choke.
Rio Bravo Oil Co.'s No. 27-A Settegast, 377 ft. S, 553 ft. W of NE cor. of Settegast "A" tract, James Hamilton Sur.
Standing 5,526 ft.
Rio Bravo Oil Corp.'s No. 9-A Settegast, 1,575 ft. N line, 350 ft. E line NE cor. "A" lease, J. A. Kopman Sur.
T.D. 5,411 ft.; standing.

MYKAWA—HARRIS COUNTY

Alpha Pet. Co.'s No. 1 W. T. Carter, Lbr. & Bldg. Co., Blas Herrera Sur., 1,320 ft. from E line, 200 ft. from S line of 320-ac. tract.
Abd. 5,470 ft.
H. C. Aiken's No. 1 Waggoner, F. J. Rothas Sur.
Rig up.
West Prod. Co.'s No. 1 J. E. Lobit, Blk. 9, F. J. Rothas Sur.
Drlg. shale 3,410 ft.
West Prod. Co.'s No. 1 Platt, W. B. Walker Sur., A-859.
Drlg. shale 1,810 ft.
West Prod. Co.'s No. 1 B. J. Speck, 330 ft. each way from the NW cor. of the tract, W. R. Wilson Sur.
Rig up.

TOMBALL—HARRIS COUNTY

Humble Oil & Ref. Co.'s No. 3 Moody, 527 ft. S of N line, 466 ft. E of W line of tract, J. H. Edwards Sur.
10¾-in. csg. 925 ft.
Humble Oil & Ref. Co.'s No. 3 Gebhardt, 1,600 ft. from N line, 466 ft. E of W line of tract, G. W. Hahi Sur.
Drlg. shale 2,810 ft.
Humble Oil & Ref. Co.'s No. 4 Blocher, 466 ft. S of most northerly N line, 421 ft. W of most easterly E line of tract, Hooper & Goodrich Sur.
10¾-in. csg. 957 ft.; drlg. shale 5,514 ft.
Humble O. & R. Co.'s No. 3 Dodge, 250 ft. from most southerly S line, 317 ft. from westerly E line, J. H. Edwards.
Drlg. shaley sand 5,586 ft.
Humble O. & R. Co.'s No. 2 Holderrith, 600 ft. from S line, 466 ft. from W line of tract.
T.D. 5,543 ft.; running csg.
Humble O. & R. Co.'s No. 1 Hillegeist, 1,-118 ft. from S line, 389 ft. from W line of 44.35-ac. tract, J. House Sur.
T.D. 5,615 ft.; 7-in. csg. 5,611 ft.
Humble O. & R. Co.'s No. 1 Schultz, 550 ft. from S line, 356 ft. from W line of 42.05-ac. tract, J. House Sur.
T.D. 5,568 ft.; 7-in. csg. 5,562 ft.; I.P. 23 bbls. per hour on ¼-in. choke.
Humble O. & R. Co.'s No. 1 Michel, 510 ft. from N line, 466 ft. from W line of lease, Wm. Hurd Sur.
T.D. 5,578 ft.; 7-in. csg. 5,578 ft.; I.P. 456 bbls. per day on ¼-in. choke; T.P. 1,200 lbs.; C.P. 1,000 lbs.
Texas Co.'s No. 3 Ziegler, 1,449 ft. E of W line and 446 ft. S of N line of lease, 930 ft. E of No. 1.
T.D. 5,583 ft.; to set 7-in. csg.

VANDERBILT—JACKSON COUNTY

Imperator Oil Co.'s No. 1 Dutton, S C of Lot No. 11, Blk. 25, 450 ft. S of R.R. and 1,350 ft. W line of townsite, Ray Musquiz Sur.
Rigged up and S.D.
Turman Oil Co.'s No. 1 T. H. Miller, 150 ft. each way out of E 50 ac. of Miller 100-ac. tract in Ray Musquiz Sur.
Rigging up.

BIG HILL—JEFFERSON COUNTY

Yount Lee Oil Co.'s No. 1-B Pipkin & Davis, 2,225 ft. from E line and 2,385 ft. from N line of survey, Wm. McFadden Sur.
Drlg. shale and sand 2,130 ft.

FANNETT—JEFFERSON COUNTY

Gulf Prod. Co.'s No. 5 Junker.
Derrick.

CLEVELAND—LIBERTY COUNTY

Black Gold Pet. Oil Corp.'s No. 2 R. D. McDonald, 466 ft. W of most westerly E line and 466 ft. N of most northerly S line of survey, 933 ft. W of Gulf Prod. Co.'s No. 7-C Kirby Lbr. Co., T. Devers Sur.
Derrick.
Gulf Prod. Co.'s No. 9-C Kirby Lbr. Co., 1,-967 ft. N, 1,400 ft. E from the NE cor. of J. S. Eldridge Sur. in the John Pleasant Sur.
Drlg. shale 4,817 ft.
William J. Colegrove et al's No. 1 State School Land & Dev. Co., 446 ft. from W line and 170 ft. from S line of survey, Clayton Harper Sur.
Location.

ESPERSON—LIBERTY COUNTY

General Crude Oil Co.'s No. 21 Esperson.
Drlg. shale 6,320 ft.
General Crude Oil Co.'s No. 1 W. D. Kay, Malcolm Duncan Sur., 1,537 ft. along N
Drlg. shale 6,706 ft.
General Crude Oil Co.'s No. 10 Davis, 2,000 ft. from E line, 660 ft. from S line of D. Kokernut Sur.
Drlg. shale 6,622 ft.

HANKAMER—LIBERTY COUNTY

Cretaceous Oil Co.'s No. 3 Ezzell, 450 ft. W of E line of tract, Levi Barrow Sur.
Moving in derrick.
Eljean Oil Co.'s No. 1 Ezzell, 1,325 ft. from N, 150 ft. from E line of Ezzell 175-ac. tract.
Drlg. shale 2,510 ft.
Gulf Prod. Co.'s No. 1-B W. L. Bingle, 159 ft. E along S line of H.&T.C. Sur., thence 378 ft.
Drlg. sand 1,856 ft.
Gulf Prod. Co.'s No. 18 Boyt, E offset to Wilson Broark Oil Co.'s No. 1 Barrow, in Levi Barrow Sur.
Drlg. shale 1,726 ft.
Gulf Prod. Co.'s No. 19 E. W. Boyt, 100 ft. from W line, 298 ft. S of No. 18, Amos Allen Sur.
Bldg. derrick.
Gulf Prod. Co.'s No. 22 Boyt, Allen Sur.
Location.
Jones Drlg. Co.'s No. 1 Ezzell, 1,050 ft. S of N line, 150 ft. W of E line of Levi Barrow Sur.
Drlg. shale 2,000 ft.
Will Strozier et al's No. 1 Ezzell, 700 ft. N of S line, 150 ft. W of E line of Levi Barrow Sur.
Derrick.

VAN VLECK—MATAGORDA COUNTY

Skelly Oil Co.'s No. 3 Cobb "B," 2,750 ft. from NW line, 2,900 ft. from SW line of M. Cummins Sur.
Location.

MARKHAM—MATAGORDA COUNTY

Superior O. & G. Co.'s No. 1 Hawk, W. H. Gainor Sur., west flank of dome.
T.D. 4,213 ft.; 7-in. csg. 4,185 ft.; cored oil sand 4,200-10 ft.; flowed salt wtr. cut with oil and gas; flowing 5 bbls. of oil per hr. and 40% wtr. on ¼-in. choke.

MOSS BLUFF—LIBERTY COUNTY

Gulf Coast Sulphur Co.'s No. 1 McManus, 533 ft. from E, 1,650 ft. from N line of W. A. tract, B. M. Spinks Sur.
Location.

CONROE—MONTGOMERY COUNTY

Humble Oil & Ref. Co.'s No. 1 Taylor, 466 ft. from S line, 308 ft. from E line of lease, J. H. Davis Sur.
10¾-in. csg. 974 ft.; T.D. 980 ft.
Humble O. & R. Co.'s No. 1 Bailey, 1,100 ft. SW from NE cor. of Alex McCowan Sur. and 466 ft. from S line R. Kuykendahl Sur.
T.D. 5,120 ft.; recovered 870 ft. of oil on D.S. test; 7-in. csg. 5,070 ft.; I.P. 23 bbls. per hour on ¼-in. choke; T.P. 275 lbs.; C.P. 1,000 lbs.
Sun Oil Co.'s No. 32 Foster.
Cmtd. csg. 5,110 ft.

SPLENDORA—MONTGOMERY COUNTY

Bryce McCandless et al's No. 1 Texas Long Leaf Lbr. Co., 330 ft. from N and E lines of the W½ of Blk. No. 8, Walker County School Land Sur.
Derrick.

ORANGE—ORANGE COUNTY

Trio Oil Co.'s No. 1 D. S. Comier, 69 ft. W of E line and 39 ft. S of N line of 6.83-ac. tract in W. M. Dyson Sur.
Drlg. shale 2,912 ft.

PORT NECHES—ORANGE COUNTY

Texas Co.'s No. 3 Orange National Bank, 750 ft. S of N line and 295 ft. E of W line of lease, Jacob Beaumont Sur.
T.D. 4,812 ft.; 7-in. csg. 4,760 ft.; I.P. 254 bbls. in 24 hours through ⅝-in. choke; T.P. 450 lbs.; C.P. 1,000 lbs.
Texas Co.'s No. 4-B Polk, 750 ft. S and 1,-450 ft. W from NE cor. of lease, Jacob Beaumont Sur.
Location.
Texas Co.'s No. 5-B Polk, 750 ft. S and 850 ft. W from NE cor. of lease, Jacob Beaumont Sur.
Rig up.
Texas Co.'s No. 6-B Polk, 750 ft. S and 250 ft. W from NE cor. of lease, Jacob Beaumont Sur.
Location.

LIVINGSTON—POLK COUNTY

Gem Oil Co.'s No. 3 Watt, 300 ft. S line, 330 ft. W line of lease, A. Viesca Sur.
Location.
Gem Oil Co.'s No. 2 Pratt, A. Viesca Sur.
Coring shale 4,175 ft.
Gem Oil Co.'s No. 6 Davis & Holmes, 652 ft. from W and 662 ft. from N line of survey, A. Viesca Sur.
Rig up.
Gem Oil Co.'s No. 7 Davis & Holmes, 1,050 ft. from E line, 800 ft. from N line of lease, A. Viesca Sur.
T.D. 4,330 ft.; P.B. 4,325 ft.
Johnson & Johnson's No. 1 I. B. Munson, 330 ft. from S and E lines of 26.12-ac. tract, A. Viesca Sur.
Tested salt water; small amount of oil; P.B. 4,322 ft.; temp. abd.
Sup. Oil Co.'s No. 2 Pratt, 320 ft. W and 388 ft. S from SE cor. of T. A. Carlton Oil Co.'s 30-ac. lease, A. Viesca Sur.
Derrick.
Werby and Refugio Oil Corp.'s No. 5 Dick & Failing, 330 ft. E of W line of tract, 550 ft. N of No. 1, A. Viesca Sur.
T.D. 4,286 ft.; 7-in. csg. 4,266 ft.; P.B. to 4,279 ft.; swabbed salt water and oil; will test with gas lift.

SAN FELIPE—WALLER COUNTY

Buck Oil Co.'s No. 1 Vaughn, 660 ft. due E of Seaporton Co.'s No. 1 Vaughn, J. McFarland Sur.
S.D. 3,237 ft.

GRETA—REFUGIO COUNTY

Hewitt & Daugherty's No. 12 Lambert.
Rig up.
Humble Oil & Ref. Co.'s No. 2 Heard, 466 ft. from N line, 810 ft. from No. 17, J. H. Peoples Sur.
10¾-in. csg. 1,239 ft.; T.D. 1,269 ft.
Humble O. & R. Co.'s No. 20 J. F. B. Heard.
Drlg. shale 1,230 ft.
Humble O. & R. Co.'s No. 19 Heard, 466 ft. from N line, 466 ft. from W line of John Peoples Sur.
7-in. csg. at 4,377 ft.; I.P. 90 bbls. per day on pump.
Humble O. & R. Co.'s No. 1 Marberry, 4,-558 ft. from S line, 466 ft. from W line of John Denn Sur.
Coring sand 4,446 ft.

REFUGIO—REFUGIO COUNTY

Houston Oil Co.'s No. 26 Rooke, 660 ft. W of No. 24 Rooke.
Derrick.
Houston Oil Co.'s No. 24 Rooke, 660 ft. NW of No. 21, McMullen Sur.
Drlg. sand 4,061 ft.
Houston Oil Co.'s No. 25 Rooke, 660 ft. W of No. 23, McMullen Sur.
Drlg. sand 3,711 ft.; 10-in. csg. 1,089 ft.
United Gas Co.'s No. 20 Lambert.
Derrick.
United Gas Co.'s No. 19 Lambert.
Coring oil sand 4,402 ft.

CLAY CREEK—WASHINGTON COUNTY

Sun Oil Co.'s No. 6 W. F. Schlottman, 400 ft. in northeasterly direction from No. 5, J. F. Perry Square League.
Drlg. shale 930 ft.

McFADDIN-O'CONNOR DISTRICTS—VICTORIA AND REFUGIO COUNTIES

Texas Co.'s No. 9 McFaddin, 1,850 ft. N. 2 deg., 45 ft. S from No. 2.
Drlg. shale and lime 5,209 ft.
Houston Oil Co.'s No. 1 Fagan, 330 ft. from Guadalupe River on the Fagan Island, F. and J. M. Rodrigues Sur., SW of McFaddin Field.
S.D.; river rising.

LOUISE—WHARTON COUNTY

Pure Oil Co.'s No. 1 John Macha, 318 ft. from NW line and from SE line of F. Walnut Sur., and 467 ft. from NE line of 101.53-ac. lease, M.&C. Sur. No. 25.
10¾-in. csg. 1,220 ft.; drlg. plug.
Pure Oil Co.'s No. 3 Stewart, 1,000 ft. SW and 318.25 ft. SE from N cor. of W. L. Stewart's 160-ac. tract, Morris and Cummings Sur. No. 25.
10¾-in. csg. 1,218 ft.; drlg. shale 1,630 ft.

BAY JUNOP—TERRABONNE PARISH

Texas Co.'s No. 6-B State, 458 ft. S, 498 ft. E of NW cor. of Sec. 34-21s-14e.
P.B. and sidetracked at 6,081 ft.; drlg. Shale 7,316 ft.

CALLIOU ISLAND—TERRABONNE PARISH

Texas Co.'s No. 23 Calliou Island.
Drlg. wtr. sand 4,210 ft.
Texas Co.'s No. 19 Calliou Island.
Drlg. salt 4,236 ft.

SOUTH LOUISIANA FIELDS

BLACK BAYOU—CAMERON PARISH

Shell Pet. Corp.'s No. 22 Watkins, 2,230 ft. W and 1,340 ft. S of NE cor. Sec. 18-12s-12w.
Rig up.
Shell Pet. Corp.'s No. 21 Watkins, 1,570 ft. E of NW cor. Sec. 17-12s-13w.
Drlg. shale 2,829 ft.
Shell Pet. Corp.'s No. 3 State.
T.D. 6,159 ft.; flowed 97 bbls. of oil and 300 bbls of salt wtr.

BOSCO—ACADIA AND ST. LANDRY PARISHES

Oswego Oil Co.'s No. 2 Moulton, Sec. 34-8s-3e.
13⅜-in. csg. at 1,335 ft.; 7-in. csg. 3,575 ft.; T.D. 3,606 ft.; I.P. 45 bbls. per hour through ¼-in. choke; C.P. 1,400 lbs.
Superior Oil Prod. Co.'s No. 3 Johnson, 2,-958 ft. S, 1,325 ft. W of NE cor. of Sec. 34-8s-3e.
Rig up.
Superior Oil Prod. Co.'s No. 8 Larcade, 1,-773 ft. S, 3,062 ft. E of NW cor. Sec. 35-8s-3e.
Drlg. sandy shale 7,151 ft.
Superior Oil Prod. Co.'s No. 9 Larcade, 2,-755.83 ft. N, 1,936.23 ft. W of SE cor. of Sec. 34-8s-3e.
Drlg. sand and shale 8,512 ft.
Superior Oil Prod. Co.'s No. 1 S. Martinez, 2,673.1 ft. S, 2,033 ft. E of NW cor. Sec. 35.
Drlg. sandy shale 7,480 ft.
Superior Oil Prod. Co.'s No. 2 Le Blanc, 1,698 ft. S, 937.09 ft. W of NE cor. Sec. 33-8s-3e.
Rig up.
Superior Oil Prod. Co.'s No. 2 E. Mire, 1,-039.07 ft. S. 916.82 ft. W of NE cor. Sec. 33-8s-3e.
Rig up.
Superior Oil Prod. Co.'s No. 2 Prejean, 300 ft. S, 490 ft. W of NE cor. of SW¼ Sec. 34-8s-3e.
T.D. 8,570 ft.; 7-in. csg. 8,547 ft.; made some oil and lots of gas; preparing to lower tubing.
Superior Oil Prod. Co.'s No. 2 C. B. Hernandez, 300 ft. N 300 ft. W of SE cor. of NW¼ Sec. 34-8s-3e.
T.D. 8,543 ft.; 7-in. csg. 8,558 ft.
Superior Oil Prod. Co.'s No. 3 C. B. Hernandez, 250 ft. N. 1,016 ft. W of SE cor. of SW¼ Sec. 34-8s-3e.
T.D. 8,575 ft.; 7-in. csg. 8,555 ft.; I.P. 405 bbls. per day through 10/64-in. choke; T.P. 1,875 lbs.; C.P. 2,500 lbs.
Superior Oil Prod. Co.'s No. 7 Hernandez, 1,291.1 ft. N 667.5 ft. E of SW cor. of NW¼ Sec. 34-8s-3e.
T.D. 8,792 ft.; 7-in. csg. 8,784 ft.
Superior Oil Prod. Co.'s No. "G" Hernandez, 3,358 ft. S, 683 ft. E of NW cor. Sec. 35-8s-3e.
Drlg. sandy shale 8,604 ft.
Superior Oil Prod. Co.'s No. 3 Malancon, 400 ft. S, 380 ft. E of NW cor. of SW¼
T.D. 8,622 ft.; 7-in. csg. 8,602 ft.
Drlg. shale and sand 8,390 ft.
Superior Oil Prod. Co.'s No. 2 Falls, 330 ft. N, 1,796 ft. W of SE cor. of Sec. 27-8s-3e.
Drlg. shale 7,089 ft.

DARROW—ASCENSION PARISH

Athens Oil Co.'s No. 1 United Land, 1,600 ft. S, 1,530 ft. W of NE cor. Sec. 15-10s-4e.
Rig up.
Humble O. & R. Co.'s No. 5 Community, 228 ft. SW of NE line of section, 200 ft. at R/A to east bank of river, Sec. 33-10s-2e.
Fishing 5,186 ft.
Humble O. & R. Co.'s No. 4 Community, 4,325 ft. from NE cor. and 283 ft. S of N line at R/A, Sec. 33-10s-2w.
Digging cellar.

CAMERON MEADOWS—CAMERON PAR.

Burean-Sutton Oil Co.'s No. 6 School Lot, 423 ft. E of No. 5.
Location.
Burton-Sutton Oil Co.'s No. 5 School Land 150 ft. N of S line and 300 ft. E of No. 2, Sec. 16-14s-13w.
T.D. 3,330 ft.; I.P. 965 bbls. per day through ¼-in. choke.
Burton-Sutton Oil Co.'s No. 4 School Land, 2,891 ft. W and 150 ft. N of SE cor. of Sec. 16-4s-13w.
Derrick.
Texas Oil Co.'s No. 11 Calcasieu Lake.
Drlg. sand 5,029 ft.

CHOCTAW DOME—IBERVILLE PARISH

Standard Oil Co.'s No. 1 Myrtle, 900 ft. N and 550 ft. W of SE cor. of SW¼ of Sec. 52-9s-11e.
Rig up.
Standard Oil Co.'s No. 5 Gay, 2,450 ft. S and 425 ft. E of NW cor. of NE Sec. 32-9s-11e.
Reaming; T.D. 4,126 ft.

DOG LAKE—TERREBONNE PARISH

Texas Co.'s No. 17 State.
Drlg. lime 4,812 ft.

FOUR ISLE—TERREBONNE PARISH

Texas Co.'s No. 9 L. L. and E., 1,838 ft. E, 2,243 ft. E of NW cor. Sec. 24-21s-16e.
Location.

GARDEN ISLAND BAY—TERREBONNE PARISH

Texas Co.'s No. 13 State, 3,391 ft. S and 1,-604 ft. W of NE cor. Sec. 107-23-32.
Rig up.
Texas Co.'s No. 15 Garden Island.
Abd. 3,492 ft.

GUEYDAN—VERMILLION PARISH

Pure Oil Co.'s No. 6, Alliance Trust, 667 ft. E, 1,787 ft. S line of lease, Sec. 34-11s-1w.
T.D. 9,379 ft.; sidetracked 9,074 ft.

HACKBERRY—CAMERON PARISH

Gulf Prod. Co.'s No. 18 Erwin, 271 ft. W and 722 ft. N of SE cor. of Sec. 12-12s10w.
Rig up.
Sutton Oil Co.'s No. 2 Portier, 717 ft. S and 50 ft. W of NW cor. SW¼ SE¼ Sec. 22-12s-10w.
Drlg. gumbo 1,289 ft.
Texas Co.'s No. 14 State, 500 ft. SE of No. 13, Sec. 13-12s-10w.
Drlg. sandy shale 4,750 ft.
Texas Co.'s No. 15 State, Sec. 13-12s-10w.
Drlg. sand rock 5,590 ft.
Union Sulphur Co.'s No. 3 Humble (W.O.).
T.D. 6,011 ft.; P.B. 4,700 ft.; sidetracking.
Yount Lee Oil Co.'s No. 13 Gulf Land, Sec. 14-12s-10w.
Drlg. shale 4,823 ft.
Yount Lee Oil Co.'s No. 1-A Gulf Land, 2,000 ft. S and 50 ft. E of the NW cor. of Sec. 22-12-10.
Rig up.

NEW IBERIA—IBERIA PARISH

Harrison & Abercrombie's No. 3 Schwing, 500 ft. N and 50 ft. E of No. 2, Sec. 34-12s-5w.
Drlg. shale 5,522 ft.
Iberia Oil Corp. and Y. D. Spell's No. 2 Bernard, 150 ft. E of No. 1, Sec. 54-12s-7e.
S.D. 3,846 ft.; salt.

IOWA—CALCASIEU AND JEFF DAVIS

Shell Pet. Corp.'s No. 4 J. D. Tuten, 330 ft. S, 1,819 ft. W of NE cor. SE¼ Sec. 13-9-7.
Location.
Shell Pet. Corp.'s No. 2 Adrain.
Redrig. hole 7,028 ft.
Shell Pet. Corp.'s No. 4 Adrain, 1,650 ft. S, 330 ft. E of NW cor. of lease.
Coring shale 6,600 ft.

JENNINGS—ACADIA PARISH

Post City Oil Co.'s No. 15 Jennings-Haywood, 108 ft. E, 368 ft. S of NW cor. Sec. 41-9s-2w.
Location.
Yount Lee Oil Co.'s No. 7 Houssiere-Latriele.
Drlg. shale 7,420 ft.

LAKE BARRE—TERREBONNE PARISH

Texas Co.'s No. 32 Lake Barre.
Drlg. shale 3,150 ft.
Texas Co.'s No. 19 Lake Barre.
T.D. 345 ft.
Texas Co.'s No. 25 Lake Barre.
S.D. 1,820 ft.
Texas Co.'s No. 14 Lake Barre.
Drlg. anhydrite.
Texas Co.'s No. 15 Lake Barre.
Drlg. anhydrite 3,310 ft.

LAKE PELTO—TERREBONNE PARISH

Texas Co.'s No. 12 Lake Pelto.
Sidetracking at 5,164 ft.
Whitestone O. & G. Co.'s No. 1 Buckley, 300 ft. S and E of NW cor. SW SW Sec. 35-19s-16e.
T.D. 3,390 ft.; abd.

LEESVILLE—LAFOURCHE PARISH

Gulf Prod. Co.'s No. 4 Bernard.
Drlg. shale 3,729 ft.
Gulf Prod. Co.'s No. 6 Allen Lane, Sec. 26-21s-22e.
Derrick.
Gulf Prod. Co.'s No. 12 Bernard, Sec. 26-21s-22e.
Location.
Gulf Prod. Co.'s No. 10 Bernard, 1,833 ft. E, 958 ft. S of NW cor. Sec. 26-21s-22e.
Derrick.
Emerald Pet. Co.'s No. 10, State, west bank, 200 ft. S of well No. 1.
Location.
Emerald Pet. Co.'s No. 11 State, east bank, 227 ft. N of well No. 1.
Location.
Emerald Pet. Co.'s No. 12 State, east bank, 250 ft. S of well No. 1.
Location.
Lincoln Oil Co.'s No. 6 State.
S.D. 3,226 ft.

Lincoln Oil Co.'s No. 5 State.
Location.
Texas Co.'s No. 31 Leesville.
T.D. 3,677 ft.; cmtd. csg.
Texas Co.'s No. 27 Leesville.
Drlg. salt 4,610 ft.

LOCKPORT—CALCASIEU PARISH

Union Sulphur Co.'s No. 6 Moss, located between No. 2 and No. 5 (W.O.).
Prepare to core deeper.

STARKS—CALCASIEU PARISH

Gulf Prod. Co.'s No. 37 Lutcher-Moore, 250 ft. E and 775 ft. N of SW cor. of Sec. 19-19s-12w.
Drlg. sand 3,850 ft.

PORT BARRE—ST. LANDRY PARISH

Gulf Prod. Co.'s No. 12 Wilson Cochran, Sec. 4-5s-6s.
Drlg. shale 3,453 ft.
Port Barre Oil Co.'s No. 2 Sybil, 3,030 ft. N easterly along section line, thence 55 ft. at R/A to the east, Sec. 20-6s-5e.
S.D. 3,763 ft.

ROANOKE—JEFFERSON DAVIS PARISH

Classel et al's No. 1 La. Irrigation Mill Co., 695.5 ft. E and 475 ft. N of SW cor. Sec. 1-9s-4w.
Location.
Humble O. & R. Co.'s No. 2 C. N. Taylor, 1,320 ft. E, 440 ft. S of NW cor. of SW¼ Sec. 12-9s-4w.
Rig up.
Humble O. & R. Co.'s No. 1 Nelson Thomas, 880 ft. W of No. 2 Kratzer, 440 ft. N and W of SE cor. of 200-ac. tract.
Drlg. sand 3,741 ft.
Humble O. & R. Co.'s No. 2-B Devilbiss, 1,127 ft. W of No. 1-B, 440 ft. S of N line of S½ of Sec. 11-9s-4w.
Drlg. sand 3,741 ft.
Humble O. & R. Co.'s No. 1 Clayton, 3,080 ft. S and 440 ft. W, NE cor. Sec. 10-9s-4w.
Rig up.
Shell Pet. Corp's No. 1 Jarnigan, 330 ft. E, 660 ft. S, NW cor. Sec. 12-9s-4w.
Drlg. shale 3,614 ft.
Shell Pet. Corp.'s No. 3 Kratzer, 1,320 ft. E and 440 ft. N of SW cor. of lease.
T.D. 7,597 ft.; plugged back.
Shell Pet. Corp.'s No. 1-B Kratzer, 660 ft. N, 330 ft. E of SW cor. of SW¼ Sec. 1-9s-4w.
Drlg. shale 5,310 ft.
Shell Pet. Corp.'s No. 4 Kratzer.
Rig up.

SWEET LAKE—CAMERON PARISH

Pure Oil Co.'s No. 12 Yount Lee Oil Co., 800 ft. S of No. 11, in line with Nos. 9 and 11, Sec. 12-13s-3w.
8⅝-in. csg. 3,140 ft.; T.D. 3,196 ft.; P.B. 7,360 ft.; I.P. 35 bbls. per hour through 5/16-in. choke; C.P. 795 lbs.

SULPHUR—CALCASIEU PARISH

Union Sulphur Co.'s No. 810 fee, 1,955 ft. S, 440 ft. E of NW cor. Sec. 29-9s-10w.
Drlg. rock 2,347 ft.
Union Sulphur Co.'s No. 1 Noble (W.O.).
Pumping.
Union Sulphur Co.'s No. 3 Kelly.
Drlg. shale and lime 5,405 ft.
Union Sulphur Co.'s No. 809 fee.
Top oil sand 3,795 ft.; coring 3,804 ft.

WHITE CASTLE—IBERVILLE PARISH

Shell Pet. Corp.'s No. 1 Wilbert.
Rig up.
Shell Pet. Corp.'s No. 1 White Castle Shingle Co., 1,830 ft. W, 100 ft. S from NE cor. of lease.
Drill stem stuck 4,234 ft.
Shell Pet. Corp.'s No. 1 Adams, 2,340 ft. N. 100 ft. E of SW cor. of lease.
Coring sand 7,454 ft.

MISCELLANEOUS WILDCATS

TEXAS

AUSTIN COUNTY

Arkansas Fuel Oil Co.'s No. 1 Herman W. Peschel, 990 ft. out of N cor. of 167.5-ac. tract, R. Stolze Sur.
Abd. 4,010 ft.
Deering & Kayser's No. 1 P. A. McClinton, 1,100 ft. from NW line and C NE and SW of 115-ac. tract in Thomas Bell Sur.
Drlg. shale 1,127 ft.
Paul English et al's No. 1 Felix Guhn, 1,000 ft. S, 360 ft. E from NW cor. of 71-ac. tract, D. Chomel Sur., 1 mile SE of Kinney.
Rig up.

BRAZORIA COUNTY

George Strake's No. 2 Truska, 991 ft. W of No. 1, H.T.&B. Sur., Sec. 7.
S.D. 6,000 ft.
Showers & Moncrief's No. 1 Hughey, 5,500 ft. NW of discovery well, in center of Lot 18, H.T.&B. Sur., Sec. 29, Abst. 292.
Location.
Texas Co.'s No. 1 Freeport Sulphur Co., 2,764 ft. N, 1 deg., 40 ft. W and 1,134 ft. S, 88 deg., 20 ft. W of NW cor. of S. F. Austin Sur., Abst. No. 35, being in the Conception Areola Sur.
Milling 3,278 ft.; T.D. 3,767 ft.
Turnbull & Irwin et al's No. 1 W. and R. H. Allison, 2,200 ft. W, 2,732.5 ft. S from
Drlg. shale 6,087 ft.

CALHOUN COUNTY

Continental Oil Co.'s No. 2 American National Realty Co., 660 ft. from NW line, 660 ft. from NE line of Sec. 6, Blk. C, Pedro Garcia Sur.
Drlg. shale 6,023 ft.

CHAMBERS COUNTY

South Gulf Oil Co.'s No. 1 J. T. White, Luke Brian Sur., 460 ft. from N line, 460 ft. from W line of 47.9-ac. tract.
Drlg. shale 3,912 ft.

COLORADO COUNTY

Gulf Prod. Co.'s No. 1 A. R. Milentz, 990 ft. N along E line from SE cor. of 160-ac. lease and 330 ft. W at R/A, I.&G.N.R.R. Co. Sur. No. 22.
Drlg. sand 2,770 ft.

FAYETTE COUNTY

Lewis Franklin's No. 1 V. Dybala, center of 75-ac. lease, A. Thompson Sur.
Location.

FORT BEND COUNTY

C. B. Bunte's No. 1 Winston, 1,495 ft. E of W line, 2,381 ft. N of S line of 350.6-ac. tract, S. Isaacs Sur.
Location.
W. A. Shafer et al's No. 1 V. B. Bortash, 693 ft. SW of NE line and 1,003 ft. NW of SE line of Sec. 52, H.&T.C. Sur.
S.D. 2,900 ft.
George White et al's No. 1 M. M. Cravins, 1,000 ft. from N, 300 ft. W of SW cor. of survey, B.B.B.&C. Sur. No. 8.
Rig up.

GALVESTON COUNTY

Coast Pet. Co.'s No. 1 Stewart, 3,416 ft. S, 200 ft. E of NW cor. of 143-ac. tract, W. K. Wilson Sur.
Moving in rig.
Gillock Pet. Co.'s No. 2 Maco Stewart, 900 ft. N and 150 ft. W of No. 1, Alex Farmer Sur.
T.D. 1,500 ft.; S.D.

GRIMES COUNTY

Hubert Holt et al's No. 1 Simon Fuqua, 1,200 ft. N of S line and 400 ft. W of E line of 177-ac. lease and survey, Moses Evans Sur.
S.D. 3,080 ft.
Dr. Marshall et al's No. 1-B Todd, 300 ft. from E line and 175 ft. from N line of 150-ac. tract in extreme NW cor. of county (25 ft. N of No. 1).
S.D. 2,005 ft.
Patton et al's No. 1 Yeager, 1,000 ft. W of E line, 170 ft. S of N line of 53-ac. tract and survey, A. Ruscolle Sur., NW of Iola Sur.
S.D. 1,000 ft.
Roan et al's No. 1 S. W. Sealy, 3,474 ft. N of S line and 850 ft. E of W line of survey, B. F. Smith Sur., 2 miles SW of Kellum Springs.
Drlg. sandy shale 3,170 ft.

HARDIN COUNTY

Frazier & Greer's No. 1 Sternberger Lbr. Co., 1,325 ft. S and 400 ft. W of the NE cor. of a 115-ac. tract, J. Pearson Sur.
Drlg. shale 4,865 ft.
Kirby Pet. Co.'s No. 3 Kirby, 2,330 ft. W, 9,850 ft. S of NE cor. of J. Stephenson Sur.
Location.

HARRIS COUNTY

Herbert-Still & Hooper's No. 1 Racker, 990 ft. E of W line, 4,290 ft. N of S line of J. C. Ogburn Sur.
Rig up.
T. S. F. Oil Co.'s No. 1 J. B. Hine, Arthur McCormick Sur., Abst. 46.
T.D. 3,524 ft.; derrick blew down; will rebuild and core deeper.
C. C. Foster et al's No. 1 H. K. Johnson, 2,000 ft. from S line and C of E and W lines of G.C.&S.F. Sur.
Drilled 25 ft. and S.D.
Johnston & Johnston's No. 1 Fee land, 330 ft. S, 300 ft. E of NW cor. of 20-ac. tract Sur., Sec. No. 5.
T.D. 5,069 ft.; P.B. 4,926 ft.; to straighten hole.
West Prod. Co.'s No. 1 Woodburn, 1,320 ft. E of W line, 2,145 ft. N of S line of survey, A. Whitlock Sur.
Drlg. shale 4,623 ft.

JACKSON COUNTY

A. M. Harris' No. 1 Whitley, 800 ft. out of SE cor. of F. G. Keller Sur.
Location.
Shell Pet. Corp.'s No. 1 W. W. McCrary, 460 ft. out of SE cor. of 50-ac. tract, A. Kountze Sur.
Coring shale 6,631 ft.

JASPER COUNTY

Republic Prod. Co. and Houston Oil Co.'s No. 1 Sabine Tram. Co., 330 ft. out of NW cor. Sec. 71, H.&T.C. Sur.
Abd. 7,616 ft.

JEFFERSON COUNTY

Sun Oil Co.'s No. 1 Hebert & Braussard, 4,890 ft. NW along SW line and 660 ft. NE at right angles to SW line, B. Blackman Sur., Abst. No. 2.
Rig up.

LAVACA COUNTY

L. A. Douglas' No. 1 Fehrenkamp, 600 ft. from W line, 720 ft. from N line of Mitchell Sur.
Drlg. shale 2,610 ft.

LIBERTY COUNTY

R. M. Bruner et al's No. 1 N. Bell, 150 ft. from N line and 150 ft. from W line of Bell's 187-ac. tract, H.&T.B. Sur. No. 4.
Rigging up.
Extension Oil Co.'s No. 1 J. A. Lovett, 330 ft. from E and 600 ft. from S line of lease.
P. P. Deevers Sur.
S.D. 4,048 ft.
J. W. Frazier et al's No. 2 Lynott & Buffum, 466 ft. from N and E lines of 60-ac. tract in extreme SE part of survey, James Robeson Sur.
Moving in.
Liberty-Independent Oil Co.'s No. 1 J. M. Neal, 3,550 varas from E line and 505 varas from N line of Samuel Strong Sur.
Drlg. shale 4,110 ft.
A. L. Maxwell's No. 1 M. P. Hinchliff, 200 ft. from E line and 1,000 ft. from the N line of survey, H.&T.C. Sur., Sec. 10a.
S.D. 4,105 ft.
Thomas et al's No. 1-A Eicke, 660 ft. from W line and 2,350 ft. from S line of tract in Green Sur.
T.D. 5,047 ft.; 6⅝-in. csg. at 5,029 ft.
Turnbull & Irwin's No. 1 Cox, 1,000 ft. from the E line and 200 ft. from S line of 108.2-ac. lease, F. J. G. Smiley Sur.
Location

MADISON COUNTY

Madisonville Pet. Co.'s No. 1 Cannon, 660 ft. N of S line, 440 ft. E of W line of 135-ac. tract, J. V. Phillips Sur.
Location.

MATAGORDA COUNTY

Continental Oil Co.'s No. 1 Feife, J. S. Criswell Sur., 3,000 ft. E of W line, 2,800 ft. N of S line of survey.
Rig up.
Dr. Griffith's No. 1 fee, 3,000 ft. from E line and 3,000 ft. from W line of Wm. H. Bell Sur.
Rig up and S.D.
Horace M. Smith, Inc.'s No. 1 Wadsworth ranch, 150 ft. out of S cor. of Lot No. 8, Blk. S. R. Fisher Sur.
Drlg. shale 7,311 ft.

MONTGOMERY COUNTY

Travis Baker et al's No. 1 Foster Estate, 1,200 ft. E of W line and 700 ft. S of N line of Blk. No. 50, J. M. De La Garza Sur.
Derrick.
Charles B. Gohlson's No. 1 Aaron Parks, 250 ft. from S line, 200 ft. from E line of Parks 139-ac. tract, J. Lindley Sur.
Drlg. shale 2,680 ft.
P. & C. Oil Co.'s No. 1 G. B. Rosebury, 466 ft. from N and E lines of 160-ac. tract, A. M. Folks Sur.
10¾-in. csg. 900 ft.; drlg. shale 1,310 ft.
Trans State Oil Co.'s No. 1 Foster, 700 ft. E of W line, 3,000 ft. N of S line, Lot 27.
Drlg. shale 4,965 ft.
Woodard-Smith-Cooper's No. 1 J. V. Scott, P. A. B. Wheeler Sur.
Sidetracking 3,130 ft.

ORANGE COUNTY

Blue Line Oil Co.'s No. 1 Godwin, Richard Ballew Sur., 300 ft. from E line and 150 ft. from NE line of Godwin 20-ac. tract.
S.D. 2,770 ft.
Ellis Oil Co.'s No. 1 G. W. Pell, 100 ft. from N and 300 ft. from W line of Pell tract in the J. M. Henerie Sur.
S.D. 1,720 ft.
Dick Schwab's No. 1 East Texas Canal Co., 330 ft. from the N and W lines of 234-ac. tract, John Jett Sur.
Rig up.

POLK COUNTY

Gulf Prod. Co.'s No. 5 Trinity Co. Lbr. Co., 6,000 ft. from S and 3,000 ft. from W line of O. Peterson Sur.
Location.
Howard Daily et al's No. 1 Z. B. Knox, 1,450 ft. W and 1,920 ft. S of NE cor. of F. Chairs Sur., 16 miles NE of Corrigan.
S.D. 60 ft.
J. F. Anderson's No. 1 E. L. Duke (O.W.D. D.), 400 ft. from E and 350 ft. from S of SW cor. of P. Michelick 50-ac. lease, Abst. 59, P. J. Mineral Sur.
Waiting on a new mud pump; T.D. 5,304 ft.
Humble O. & R. Co.'s No. 1 Texas Long Leaf Lbr. Co., 466 ft. from NE line and 2,250 ft. from the NW line, Sec. 21, A. Viesca Sur.
Drlg. sandy shale and shells 3,217 ft.
J. W. Leggett et al's No. 1 Bergman, C of 294-ac. tract, or 1,100 ft. W of H.E.&W.T. R.R., J. T. Pinkney Sur.
Rig up.
Dick Schwab's No. 1 Lynch, 330 ft. out of NW cor. of 200-ac. tract in the George Jameson Sur.
Location.

REFUGIO COUNTY

Cecil Hagen et al's No. 1 Edith Clarkson, 1,736 ft. from N line, 3,820 ft. from E line of J. Coughlin Sur.
Location.
Magnolia Pet. Co.'s No. 1 Woods, 330 ft. from S and W lines of S. Turner Sur.
T.D. 6,754 ft.; showing gas.

ROBERTSON COUNTY

H. L. Patton's No. 1 H. Ely, located on a 616-ac. tract, A. Manchola Sur.
S.D. 2,335 ft.

SAN JACINTO COUNTY

Shell Pet. Corp.'s No. 1 K. Moore, 5,400 ft. from W line, 1,250 ft. from S line of lease, T. F. De Rumayor Sur.
Bldg. derrick.
Ralph Sturam et al's No. 1 R. B. Love et al, 475 ft. S of N line and 2,000 ft. W of E line of 177-ac. tract, Drury McGee Sur.
Moving in rig.

TRINITY COUNTY

Gulf Prod. Co.'s No. 1 Trinity Lbr. Co., 4,500 ft. W of E line, 1,200 ft. N of S line of survey, J. M. Gomez Sur.
Rig up.

VICTORIA COUNTY

Costa Oil Co.'s No. 1 Schovjasa, 330 ft. out of N cor. of Lot No. 14, Wm. Rupley Sur.
Drlg. shale 3,713 ft.
Eastern States Pet. Co.'s No. 1 Williams, 330 ft. out of S cor. of 130-ac. tract, E. Benavides Sur.
Location.
L. A. Gillespie and Superior Oil & Gas Co.'s No. 1 R. W. Brandt, 330 ft. from NE line, 330 ft. from NW line of tract No. 11, Henderson & Pickering Subd., Wm. Rupley Sur.
Cmtd. surface csg.
L. A. Gillespie and Superior Oil & Gas Co.'s No. 1 John Janis, 330 ft. from SW line of survey and on the SE line of Nancy Dean Sur.
Location.
Gillespie and Superior O. & G. Co.'s No. 1 Farber, 330 ft. from N and E lines of Lot 6, Nancy Dean Sur.
Drlg. lime 4,808 ft.
Magnolia Pet. Co.'s No. 1 Henderson & Pickering, E offset to discovery well, Wm. Rupley Sur.
Moving in material.

WALKER COUNTY

Boone Bros.' No. 1-D Texas Long Leaf Lbr. Co., 330 ft. E and 275 ft. N of SW cor. of 112.6-ac. tract, Mary Milsap Sur.
Showed oil and salt wtr. from 3,645-75 ft.; T.D.
S. E. Gray's No. 1 Winzell, 1,200 ft. N and 1,000 ft. E of most southerly S line of survey.
T.D. 3,996 ft. (corrected); drlg. in new hole 1,810 ft.

WASHINGTON COUNTY

Powers Prod. Co.'s No. 1 Boenker, 550 ft. S, 250 ft. W from NW cor. of Dodson 100 acres, J. Newman Sur.
Spudded.

WHARTON COUNTY

Texas Co.'s No. 2 Pierce Estate, 2,425 ft. S, 31 degrees 20 ft. E, 4,400 ft. N, 58 deg. 40 ft. E from W cor. of Pierce Estate Land, I.&G.N.R.R. Sur. No. 39.
20-in. csg. 35 ft.; drlg. in gumbo 776 ft.

SOUTH LOUISIANA

ACADIA PARISH

Continental Oil Co.'s No. 1 T. Ortego, 990 ft. S, 500 ft. E of NW cor. SW¼ Sec. 31-7s-2w.
Rig up.
Humble O. & R. Co.'s No. 1 American Rice Mills, 660 ft. S and 1,320 ft. W from NE cor. Sec. 27-10s-1e.
T.D. 8,282 ft.

AVOYELLES PARISH

Bell Drlg. Co.'s No. 2 Thompson, 450 ft. S, 860 ft. E, NW cor. NE¼ Sec. 11-2n-5e.
Rig up and S.D.
Southern State Pet. Co.'s No. 1 Boyette, 330 ft. N and 330 ft. E of SW cor. Sec. 23-3n-5e.
S.D. 3,887 ft.

BEAUREGARD PARISH

Chew & Kirby's No. 1 Long Bell Lbr. Co., 330 ft. S and W of C of NE¼ Sec. 26-2s-8w.
S.D. 2,880 ft.
Richardson & Martin's No. 1 Southwest Lbr. Co.
Location.

CALCASIEU PARISH

Fred Oil Co.'s No. 2 Faizst, 262 ft. E and 83 ft. S of NW cor. SE¼ Sec. 26-8s-10w.
Drlg. shale 2,438 ft.
Fohs Oil Co.'s No. 5 Castle, 660 ft. S. of No. 1 Castle
Drlg. shale 6,503 ft.
Nicholas McCaleb's No. 1 Grey, 2,200 ft. S 1,200 ft. E of NW cor. Sec. 32-8s-13w.
S.D. 850 ft.
Texas Co.'s No. 3 Nickerson, 2,739 ft. N, 3,750 ft. W of SE cor. Sec. 12-10s-8w.
Drlg. sand and gravel 127 ft.
Texas Co.'s No. 2 Nickerson, 2,304 ft. N, 4,322 ft. W of SE cor. NW sec. 12-9s-8w.
Drlg. lime 6,600 ft.
Union Sulphur Co.'s No. 9 State, NW offset to Texas Co.'s No. 2 Nickerson.
Drlg. sand and gravel 324 ft.
Union Sulphur Co.'s No. 1 Castle, 326 ft. N and E of NW Sec. 13-9s-8w.
Drlg. shale 4,577 ft.
Union Sulphur Co.'s No. 1 Buhler, 1,465 ft. N and 425 ft. W of SE cor. Sec. 11-9s-8w.
P.B. 3,100 ft.; sidetracking.
Union Sulphur Co.'s No. 6 State.
Drlg. wtr. sand 6,167 ft.
Union Sulphur Co.'s No. 2 Powell, 1,279 ft. S, 1,621 ft. E of NW cor. Sec. 12-9s-8w.
Bldg. derrick.
Wheeler Oil Corp.'s No. 1 School Lot, 1,708 ft. E, 1,325 ft. N of SW cor. Sec. 16-9s-7w.
S.D. 980 ft.

CAMERON PARISH

Magnolia Pet. Co.'s No. 1 J. B. Broussard, 330 ft. E and S, out of NW cor. of the SW¼ of SE¼ of Sec. 13-12s-9w.
Drlg. shale 6,370 ft.
Steinberger Pet. Co.'s No. 1 Drew, 330 ft. out of NW cor. NE¼ of Sec. 26-10s-11w.
Location.

EAST BATON ROUGE PARISH

Superior Oil & Prod. Co.'s No. 1 Duplanter-Community, 1,500 ft. westerly along the N line from the NE cor. of D. A. and E. A. Duplanter's 130.7-ac. tract, thence 330 ft. at R/A.
Drlg. shale 3,818 ft.

EAST FELICIANA PARISH

Thompson Creek Oil Co.'s No. 1 Fannie Neland, 2,600 ft. E and 1,580 ft. N of SW cor. Sec. 70.
S.D. 1,589 ft.

EVANGELINE PARISH

Basile's No. 1 Haas, 1,680 ft. S of N line, 350 ft. W of E line of NE cor. Sec. 14-6s-2w.
10¾-in. csg. 1,361 ft.; T.D. 1,363 ft.

IBERIA PARISH

Texas Co.'s No. 1 State Fausse Point.
Drlg. shale 4,043 ft.

JEFFERSON PARISH

Lincoln Oil Co.'s No. 1 Rigaud, Sec. 28-21s-25e.
Abd. 7,039 ft.
Texas Co.'s No. 1 Bayou St. Dennis, 20,907 ft. S, 4,853 ft. E of NW cor. of Twp., Sec. 19-17s-24e.
T.D. 9,572 ft.; recovered 2,500 ft. of oil on D.S. test; to set csg. at 9,558 ft.

LAFOURCHE PARISH

Southern Sulphur Corp.'s No. 1 D. L. Lagraize, 300 ft. E of NW cor. of Lot 7, thence 250 ft. S of Sec. 26-21s-22e.
Spudded and shut down.

PLAQUEMINES PARISH

Venice Corp.'s No. 1 Burras.
S.D. 2,119 ft.

RAPIDES PARISH

J. B. Evers' No. 1 G. Wettermark, 540 ft. S and 520 ft. E. NW cor. NE SW Sec. 35-6n-2e.
Location.
Williams-Terrell & Day's No. 1 Armstrong & Murphy, 286 ft. N and 300 ft. W of SE cor. Sec. 24-5n-1w.
Abd. 2,418 ft.

ST. BERNARD PARISH

Danciger's No. 1 Battles, 836 ft. N, 2,198 ft. W of SE cor. Sec. 135-14s-14e.
Reaming 6,504 ft.
Emerald Pet. Corp.'s "Shell Beach Properties" No. 1, on S edge of Bayou Louis, Sec. 31-13s-15e.
Set 800 ft. 10-in. surface csg.

ST. LANDRY PARISH

C. B. Bunte's No. 1 Thistle Waite Lbr. Co., 7,590 ft. W and 1,980 ft. S of NE cor. Sec. 68-5s-4e.
Cmtd. surface csg. 1,100 ft.

ST. MARTIN PARISH

Texas Co.'s No. 1 State-Plumb Bob, 3,107 ft. E and 2,154 ft. N of SW cor. Sec. 9-8s-7w.
Drlg. shale 7,410 ft.

TANGIPOHA PARISH

R. A. Conklin's No. 1 Lake Superior Piling Co., 200 ft. W and N of SE cor. Sec. 19-5s-9e.
Temp. abd. 4,539 ft.

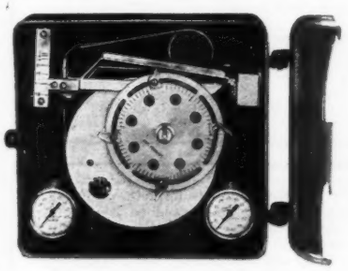
VERMILLION PARISH

Moore Bros.' No. 1 Brussard, 350 ft. S of N line, 250 ft. E of W line, NE cor. Sec. 32-11s-3e.
S.D. 4,056 ft.

NEW AND IMPROVED EQUIPMENT

Intermitter Controls Flow Cycle of Gas-Lift Systems

A simple, dependable instrument for controlling the flow cycle of gas-lift systems is said to be offered in the Taylor Instrument Companies' intermitter, adjustable to admit the repressuring medium into the well for the required length of time and at the specified intervals. The instrument also can be used to produce a series of quick "kicks" immediately before admitting the full pressure. If it becomes desirable at any time to alter the original repressuring schedule,



it may be easily accomplished without replacing or cutting the cam. In fact, the versatility of the instrument seems to permit unlimited experimentation with schedules to obtain the most efficient oil and gas ratio.

Instead of a fixed cam to time the intermittent operation of a diaphragm valve or other diaphragm-operated devices, the Taylor intermitter has a circular cam on which the proper number of actuating lugs may be placed, the number of lugs corresponding with the number of operations to be performed during the rotation of the cam. As many as 20 lugs may be used. The duration of each operation is adjustable by moving the bracket carrying the nozzle (upper left corner of case) so that its scribe mark is opposite the desired time interval on the scale. The higher the position of the nozzle, the shorter the period of nozzle closure and the duration of the operation.

The actuating cam is driven by a powerful and accurate spring-driven or electrically driven clock, available with 1, 6, 12 or 24-hour periods of rotation. The clock in the illustration has a 6-hour rotation period. The instrument is available in two types: Reverse-acting; lugs close nozzle, applying pressure to diaphragm motor. Direct-acting; lugs open nozzle, relieving pressure from diaphragm motor.

The Taylor intermitter may be mounted on any diaphragm valve or, if this is not desirable, in any convenient adjacent location. If it is desirable to vent the natural pressure from the tubing while the control valve is closed, a separate diaphragm valve also may be operated to perform this function.

Although the Taylor intermitter was designed primarily for controlling the flow cycle of gas lift systems, it is equally efficient on any application which requires the repetition of an operation at given time intervals.

NEW ALLOY STEEL ANNOUNCED

A new alloy steel has been announced by the Youngstown Sheet & Tube Co. This new product, known as Yoloy, is a nickel copper alloy steel, having exceptional resistance to corrosion, and high tensile strength combined with high ductility, workability and weldability. Yoloy steel is produced in sheets, strips, plates, bars, shapes, wire and seamless pipe.

Notes About Trade Literature

A booklet of value to engineers and production men is a 16-page one issued by the S. M. Jones Co., Toledo, Ohio, and Tulsa, on "The Relation of Pumping Conditions to Sucker-Rod Selection." It is in great part an engineering publication, containing fundamental information concerning sucker-rod performance.

—

Parker Appliance Co., Cleveland, Ohio, is sending on request a bulletin of eight pages descriptive of the Parker production tube bender.

—

The Foxboro Co., Foxboro, Mass., announces a 48-page bulletin, "Meters for Steam, Liquids, Gas," covering the complete line of Foxboro meters for industrial uses. Of particular interest is the description of the new Universal flow meter to measure steam, water, air, oil, gas, and all kinds of chemical solutions.

—

The Lane-Wells Co. of Los Angeles (branches in Houston, Tulsa, Oklahoma City and New York) has completed a 74-page catalog on packers, liner hangers and gun perforator service. It gives practical applications of each product not generally known. Copies will be sent to production men who write to Lane-Wells Co., 4439 Santa Fe Avenue, Los Angeles, Calif.

—

The current number of Nickel Steel Topics, published by the International Nickel Co., 67 Wall Street, New York, contains several articles of special interest to oil men, including one on how gigantic drilling tools are hollow-bored to unusual accuracy.

—

The Gardner-Denver Co., Quincy, Ill., has issued a 16-page bulletin on its centrifugal side-suction pumps.

—

Instruments for testing petroleum products are described and illustrated in an 8-page bulletin (No. 120) sent on request by the Precision Scientific Co., Humboldt Park Station, Chicago.

—

A four-page bulletin prepared by the Oil Well Supply Co. and obtainable at any of its oil-field branches, gives details concerning the company's new Grade "S" sucker-rods designed to combat corrosive embrittlement in sulphide wells.

—

J. P. Devine Manufacturing Co., Inc., Mt. Vernon, Ill., announces its condensed general catalog No. 105-B, covering its complete line of process equipment, including absorption plants, coolers, fractionating columns, etc.

—

The Link-Belt "Positive" self-aligning idler for troughed conveyor belts is the subject of a six-page folder prepared by Link-Belt Co., Chicago.

—

A bulletin describing Worthington two-stage volute centrifugal pumps, Type U, may be obtained from the Worthington Pump & Machinery Corp., Harrison, N. J.

—

The Refinery Supply Co., 621 East Fourth Street, Tulsa, is sending on request a bulletin describing its new Gregory test column for determining gasoline content of natural gas, gas and gasoline analysis in the field and operating efficiencies for plants.

—

A 96-page catalog ready for distribution by the Taylor Forge & Pipe Works, Box 485, Chicago, covers the company's entire line of forged steel pipe flanges and seamless welding fittings.

—

General Cable Corp., 420 Lexington Avenue, New York, has released a 12-page booklet on nonmetallic and metallic armored cables and a leaflet on the vacuum process lead sheath.

Promotions in Baash-Ross Tool Co.'s Staff Announced

Recent changes in Baash-Ross Tool Co. include the appointment of H. C. (Hans) Ross as sales manager and the election as vice president of John B. Schuyler, who will act as a special sales representative. Erwin Burns, vice president, has been elevated to general manager and will continue as assistant to L. F. Baash, president. With the establishment of a service branch and machine shop in Bakersfield, Calif., and a plant in Houston, Tex., Baash-Ross is well represented in the major active fields of the Mid-Continent and California. T. E. (Tommy) Ward is in charge of the export office in New York.

Safety, Convenience and Speed Found in Rod Hook

Safety, convenience and speed in handling rods have been combined in the newly designed rod hook made by the Byron Jackson Co., 2150 East Slauson Ave., Los Angeles, Calif. With a locking arm providing safety from the standpoint of both construction and operation, an increase in speed and convenience in handling the tool has been secured by means of a natural, one-hand grip at the center of balance combined with a convenient method of opening and closing the hook.

The grip which operates the releasing mechanism is in the shank of the hook at the center of balance so that the operator can, with one hand, steady the hook, open the locking arm, and engage or remove the bail of the rod elevator. The locking arm which connects the bill to the body forms a closed C-link that both increases the strength and eliminates the repeated flexing of the hook under load. The tendency to fatigue and crystalize the metal is thus removed. Moreover, any possibility of the elevator bail becoming disengaged is eliminated since the locking arm can only be unlatched by the operator.

The locking arm is held in closed and locked position by a spring until the operator grasps the releasing mechanism. While the releasing mechanism is compressed, the locking arm remains open; but instantly closes after the elevator bail is safely within the hook and the operator releases his hold. The BJ rod hooks are furnished in three sizes.

DIESELS FOR ROTARY DRILLING

Two six-cylinder Diesel engines will soon be ready for shipment from the Cooper-Bessemer Corp. plant in Grove City, Pa., to the Rowan Drilling Co., Fort Worth, Tex. These new prime movers will be used to V-belt drive Westinghouse D.C. generators of 200 K.W. each. The size is the one that seems to be favored for this type of service. Mounted on structural-steel skids, the Diesels are semiportable. Each engine is rated 240 horsepower at 525 r.p.m. Each is equipped with a twin-disc clutch. Provision is made for starting by air.

PERMITS SAFE USE OF ACID

American Chemical Paint Co., Ambler, Pa., has developed a new chemical, Murodine, for use with muriatic acid in acidizing wells. The manufacturer asserts that this product prevents the action of the acid on well tubings and casings but does not hamper the action of the acid on the lime strata. Its use is said to be simple.

CLASSIFIED ADVERTISING

For Sale—Equipment *For Sale—Equipment* *For Sale—Equipment* *For Sale—Equipment*

We list below a few of the major items of equipment located at the Continental Oil Refinery, Sapulpa, Oklahoma, which we are now dismantling. In our many years' experience dismantling major refineries, this plant offers the highest quality late type equipment. An unusual opportunity is afforded to save a large part of the new cost. Your inspection is invited.

BUBBLE TOWERS

7' x 58' x ⅛" plate bubble tower, welded, 18" walkway, 21 trays, 10" vapor line at top, 3' 6" skirt, 9 clean out man holes in mid section. All caps bolted to 1x1 angles.

8' x 52' x ⅛" plate bubble tower, welded, 18" walkway, 22 trays, 72 bubble caps, 6⅝" O.D., 21" manhole and 12" vapor outlet at top, 15' skirt. All caps bolted to 1x1 angles.

9' x 42' x ⅛" plate bubble tower, welded, 18" walkway, 22 trays, 68 bubble caps, 6⅝" O.D., 21" manhole and 12" vapor line on top. All caps bolted to 1x1 angles.

6' x 35' x ⅜" Plate Riveted bubble tower, 20 bubble decks, 62—6⅝ O.D. bubble caps, 1—18" manhole, 4' from bottom, 6 take off samplers at bottom.

6' x 35' x ⅜" Plate Riveted bubble tower, 20 bubble decks, 62—6⅝ O.D. bubble caps with sample take offs at each tray, 1—18" manhole 4' from bottom and 1—18" manhole 12' from top, 18" walkway and barometric and jet barometric condensers at top.

2 Gray Towers, 8' x 16' x ½" Plate, ⅝" Plate head and top, 75 lbs. working pressure at 500° F.

6' x 20' x ⅛", 15 decked bubble tower riveted and welded (7 decks, 96 caps; 8 decks, 88 caps), and 6⅝" hole in center. All caps and trays electric welded; 18" manhole, 3' x ⅜" skirt liquid level control sampling lines each tray.

6' x 20' x ⅛", 15 decked bubble tower riveted and welded samples each tray liquid level control, no skirt.

HOT OIL PUMPS

2—National Transit hot oil pumps, 15½x35 3/16x3¾x24 Piston type, steel liquid ends, water cooled jackets, spool valves, 400 lbs. pressure, 900° F., cap. 12000 barrels for 24 hours, driven by condensing type, cross compound Corliss steam engine. Pumps installed in 1927, used a short time and are as good as new.

4—Byron Jackson, 2 stage VC, hot oil charging pumps, 2x12, cap. 143 GPM, 305 Hd. Ft. connected to 20 HP G.E. motors, 1725 RPM.

1—Worthington Centrifugal hot oil pump, size 3", cap. 400 GPM, 400 lbs. pressure, serial No. 790842W, speed 3600 RPM, connected to G.E. 75 HP vapor proof motor, 3 PH, 60 Cy., 440 V, 3600 RPM.

2—Pacific horizontal split shell Centrifugal pumps, double suction, water cooled jackets, steel fluid ends, type DHTB, size 2", cap. 215 GPM, 210 Hd. Ft., 3400 RPM. Direct connected to Terry Steam Turbines, 95 lbs. steam pressure, 3600 RPM.

2—Worthington Duplex steam driven hot oil pumps, steel fluid ends, size 10x5⅞x 12, cap. 200 GPM, pressure 300 lbs. at 125 lbs. steam pressure.

1—Worthington Simplex steam driven hot oil pump, steel liquid end, water cooled jacket, size 20x5x24, serial No. D112792, 4" suction x 3" discharge, cap. 110 GPM, pressure 300 lbs. at 110 lbs. steam pressure.

CRUDE CHARGING PUMPS

1—Byron Jackson Centrifugal pump, size 6", cap. 160 GPM, Hd. Ft. 1110, Serial No. 100993, driven by Terry Steam Turbine, 85 HP, steam pressure 95 lbs., serial No. 11389.

1—Byron Jackson Centrifugal pump, size 6", cap. 160 GPM, Hd. Ft. 1110, serial No. 100994, driven by GE Vapor Proof motor, 100 HP, 3 Ph., 60 Cy., 440 V, 3540 RPM.

Kinney Gear-Driven Rotary Pump, 4" suction, 4" discharge, Type S.D. 646, Ser. No. 6889, Type 7. Driven by 5 HP W.E. Motor, 1150 RPM.

Kinney Gear-Driven Rotary Pump, Size 6", 725 GPM, Type SD-888, Ser. No. 8497. Driven by 15 HP. W.E. Motor, 860 RPM.

Kinney Gear-Driven Rotary Pump, Size 6", 425 GPM, Type SD-888, Ser. No. 8499. Driven by 10 HP W.E. Motor, 1200 RPM.

BY-PRODUCT RECIRC PUMPS

3—Pacific Horizontal split shell, 2 stage Centrifugal pumps, type LMD, size 1¼, cap. from 45 GPM to 70 GPM, pressure 35 to 50 lbs., temp. 70° F., Beaume 40° to 52°, direct connected to G.E. motors, 5 HP, 3 Ph., 60 Cy., 440 V, 3400 RPM, type KT934.

3—Byron Jackson, 2 stage Centrifugal pumps, size 1½x8, cap. 45 GPM, Hd. Ft. 210, temp. 70° F., Beaume 40° to 52°, direct connected to G.E. 7½ HP, 3 Ph., 60 Cy., 440 V, 3460 RPM, type KT934.

1—Gould Centrifugal pump, size 2", cap. 70 GPM, differential Hd. Ft. 125, Ser. No. 132369, driven by G.E. 5 HP, 3 Ph., 60 Cy., 440 V, 3600 RPM, Type KT934. These pumps used at kerosene, gasoline and distillate service.

BRAUN HEAT EXCHANGERS

4—Type D-120, Shell Pressure 75, Tube Pressure 50, shell temp. 400, tube temp. 500.
3—Type D-155, shell pressure 100, tube pressure 300, shell temp. 650, tube temp.350.
4—Type F-120, shell pressure 50, tube pressure 75, shell temp. 650, tube temp. 500.
6—Type I-80, shell pressure 75, tube pressure 300, shell temp. 900, tube temp. 650.
2—Type K-120, shell pressure 400, tube pressure 300, shell temp. 50, tube temp. 300.
3—Type B-120, shell pressure 100, tube pressure 300, shell temp. 650, tube temp. 350.

STEAM TURBINES

Terry Turbine, 129 HP, Steam Pressure 100 lbs., Back Pressure 5 lbs., Type G, 2600 RPM, Ser. No. 11387, with Governor.

Terry Steam Turbine, 85 HP, Steam Pressure 95 lbs., Back Pressure 10 lbs., Ser. No. 11389, with Governor.

Terry Steam Turbine, 12 HP Steam Pressure 95 lbs., Back Pressure 10 lbs., 3600 RPM, Ser. No. 11477, with Governor.

Terry Steam Turbine, 10 HP, Steam Pressure 95 lbs., Back Pressure 10 lbs., Ser. No. 11480, with Governor.

Terry Steam Turbine, 60 H.P. Steam Pressure 150 lbs., Back Pressure 10 lbs., Ser. No. 9554, Speed 2450, with Governor.

CENTRIFUGAL WATER PUMPS

2—Allis Chalmers Centrifugal Pumps, size 8", cap. 1600 GPM, differential Hd. Ft. 130, direct connected to Westinghouse 75 HP electric motor, 3 Ph., 60 Cy., 440 V, speed 1750 RPM.

2—Worthington Centrifugal Pumps, size 8", cap. 1600 GPM, differential Hd. Ft. 130, direct connected to Western Electric 75 HP motor, 3 Ph., 60 Cy., 440 V, speed 1800 RPM.

2—Cameron Centrifugal Pumps, size 10", cap. 1600 GPM, differential Hd. Ft. 60, direct connected to Western Electric, 40 H.P., 3 Ph., 60 Cy., 440 V., speed 1150 RPM.

CONTROL INSTRUMENTS

3—Complete control rooms containing Brown electric temperature recording and indicating pyrometers, Brown electric recording and controlling temperature pyrometers, Brown electric recording and controlling flow meters, Westcott differential recording flow meters and Foxboro recording and controlling air actuated instruments. All controlling instruments complete with relay, electrically and mechanically controlled valves. All other instruments complete with thermo couples, wire, tubing, etc. Space prevents us from listing individual instruments but nearly every requirement can be met.

Many other items such as FIRE FIGHTING EQUIPMENT, electric and steam driven AIR COMPRESSORS, AGITATORS, OIL RECLAIMING EQUIPMENT, FLOOD LIGHTS, STEAM TRAPS, STEEL WALKWAYS, STAIRWAYS AND GRATINGS, SIMPLEX and DUPLEX STEAM PUMPS, CONDENSER BOXES, and CONDENSER COOLING COILS. 100 miles oil steam and water line pipe in sizes ranging from ⅜" to 12". Hundreds of Crane and Walworth series 15 and 30 CAST STEEL VALVES and FITTINGS. Also standard 125 lb. FLANGED AND SCREW CRANE AND CHAPMAN GATE VALVES AND FITTINGS. All in good order.

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3—73 H. P., 180 lb., W.P. Broderick, Locomotive Type Boilers.

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40 MILES 3" 11½ thread used wrought iron line pipe @ 18c per foot f.o.b. cars Clarksburg, W. Va. 15,000' 4" 9 thread used wrought iron line pipe @ 20c per foot f.o.b. cars Clarksburg, W. Va. 15,000' 3" used wrought iron line pipe @ 11c per foot f.o.b. cars suitable for gravity oil line. All pipe is cleaned, straightened, oiled, and sold subject to inspection while loading. Wright Brothers, Clarksburg, W. Va.

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3 ALMOST NEW WELDED STEEL MODERN BUBBLE TOWERS

4'	by 39'	$1.000.00
3' 6"	by 39'	750.00
3'	by 33'	550.00

F.O.B. cars Kansas City.
Towers are insulated. Man-hole plates on each tray. APPLY BOX 2007. TULSA, OKLA.

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WANTED — 125 gallon grease kettle 100 pounds steam jacket pressure, double motion agitator, chain or direct drive. Dopp kettle preferred. Give price and full particulars in first letter. Box G-661, The Oil and Gas Journal. Tulsa, Okla.

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8x4x8 Horizontal Ingersoll-Rand Compressor or one capable of handling about 150,000 cubic feet per day to 250-lb. pressure. State exact location, condition, size, make, and best cash price. Address Box G-681, The Oil and Gas Journal. Tulsa, Okla.

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I OWN and will sell the best producing royalties in Van, East Texas, and Wheeler County, Texas Fields. I own 400 acres full one-eighth land owner's royalty participating in rentals under ten year lease to major companies. Heavy development. $3.00 an acre, rentals paying 9¾% interest in advance. Also have some leases in Upshur County, East Texas Field in line of development. Recently bought forty acres there for $2,000.00; am getting $60,000.00 in oil for it. Will buy royalties and leases in Texas and Oklahoma in any amounts. P. R. KNICKERBOCKER, 3237 Westminster St., Dallas, Texas.

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Royalties—Production

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Oil leases and royalties near drilling wells, on good geology in the Permian Basin of West Texas. Jas. E. Robinson, San Angelo, Texas.

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NEW MEXICO Oil and Gas Leases and royalties. Send 50 cents in stamps for new State Oil Map of New Mexico. Roy G. Barton, Clovis, New Mexico.

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TULSA, OKLAHOMA

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CLASSIFIED ADVERTISING

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PROSPECTUSES prepared and deals shaped up for registration or exemption under Federal Security Act. Fee basis. John Morris, Seventh Floor, 1237 Market St., Philadelphia, Pa.

MILLER, 207½ E. Third St., Tulsa, Okla. Prospectus preparation and presentation. General assistance in all marketable matters. Correspondence invited.

CAPITAL—An experienced dependable broker will aid in financing project of merit. AMSTER LEONARD, 316 South Clark St., Chicago.

WANTED LOAN $110,000, for 5 years, 4% interest. Security first mortgage on 9,000 acres that has splendid oil indications. Is on head of San Saba river in West part of Menard County, Texas. Six miles running water, two big everrunning springs, good house. Thirty miles of high-netting fence, many hundred fine pecan trees. Worth today $18 per acre. Atlantic and other major oil companies have leases adjoining and close by. Big drilling campaign is getting under way in this area. Will give one-fourth participating royalty under entire 9,000 acres to party making loan. None of tract is now leased. No dry holes. Oil is expected in the Pennsylvania at 1,800 to 3,500 ft., in Ordovician at 3,800 to 4,500 ft. Money loaned on land such as this is absolutely safe. This together with the many good indications of oil makes this proposition doubly attractive to men of vision. H. B. Opp, c/o Roberts Hotel, San Angelo, Texas.

Engineering Service

Examination & tests on wells to determine gas-lift requirements. Estimates and construction gas-lift compressor plants. S. F. Shaw, Skirvin Hotel, Oklahoma City.

GEOLOGIST GEOPHYSICIST: SCHOOL OF EXPERIENCE. 10 Yr. survey Gulf Coast and Mid-Continent. Instruments with all or portion of 47 oil fields accredited. Inquiries and dealings held confidential. Gilbert W. Tinsley, 3733 Jasmine Ave., Palms Station, Los Angeles, Calif.

WE BELIEVE OUR METHOD to be the quickest and surest for locating new oil and gas pools. Work done on fee and interest basis. The Mid-West Development Company, 423 Cuyahoga Bldg., Cleveland, Ohio.

Help Wanted

WANTED Driller to drill oil wells in a shallow Oil Field and take his pay in oil. P. O. Box 1343, Big Spring, Texas.

Help Wanted

ENGINEER WANTED

Experienced in design, construction and operation of Natural Gasoline plants. Must be qualified to assume responsible charge of engineering department of an active company. Permanent job. Applicants shall give full personal information, training and experience in first letter. Employees of the Company know of this advertisement. Address

Box G-674
The Oil and Gas Journal
Tulsa, Okla.

JUNIOR Sales Engineer wanted for traveling mid-continent by nationally known equipment builder to fill vacancy caused by promotion. We need technically trained mechanical or electrical engineer with at least two years' practical design, field or shop experience. Age 25 to 30 years. Give full details including salary desired. Address Box G-670, The Oil and Gas Journal, Tulsa, Okla.

RESPONSIBLE organization has opening for Sales Engineer with Refinery experience. Give complete information as to training and experience. Address P. O. Box 1442, Houston, Texas.

Situations Wanted

Do you need sales representative TULSA area? Then wire H. G. Schiveley, Tulsa, Okla., for capabilities, exp., refs. Would consider move to South Texas.

Ref. const., maint. engr., 14 yrs. varied exp. Now located in east. Go anywhere. Avail. one week. Address Box G-680, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES MANAGER with men calling on all oil and gas companies on West Coast desires additional lines, preferably where stocks may be maintained, must be standard lines that are now selling or have been sold on coast. Address Box G-682, The Oil and Gas Journal, Tulsa, Oklahoma.

Business Opportunities

WANTED parties to finance the drilling of ten to fifteen wells on drilling blocks in Texas. Parties to have their money returned out of production and sale of acreage and to be given half interest in properties when paid out. Will furnish best of bank reference also reference Major Companies. Address Box G-671, The Oil and Gas Journal, Tulsa, Oklahoma.

Canadian Fields

(Continued from Page 122)

nia, Ontario, and it is planned to drill several tests simultaneously.

Hydro-Carbon Products, Ltd., has been incorporated in Manitoba under provincial charter to carry on geological exploration leasing and development work in Manitoba, Saskatchwan and Alberta. Officers are: President, Percy Scott, of J. M. Scott Co.; vice president, Alexander Boyd, of Wingold and Genevra Mines; managing director, J. C. Ellis; secretary-treasurer, W. A. Wisher; consulting geologist and director, Grenville Gates Howard; directors, L. R. Hannah and L. O. Tollefson. Mr. Hannah has been prominent in Montana oil development, being associated with the Hannah-Porter and Dakota-Montana companies, trustee of Producers Development of Montana, president of Montana Crude Purchasers and vice president of Imperial Natural Gas of Washington. Mr. Tollefson is president of the last named. It is understood Imperial Natural Gas will take over a Dominion company with a wide spread of leases and operate in Canada under their name, the deal being made on an exchange of stock basis. Operations of these companies, though extending into Manitoba and Alberta, will center in north central Saskatchewan with special attention to the Hudson Bay Junction-Kakwa area.

Drilling in Ontario

In the Dover Field, Kent County, Ontario, Prairie Oil & Gas Co.'s No. 3, Stephens farm, Lot 2, Front Concession, Dover East Township, is making approximately 100 bbls. a day from the Trenton limestone at 3,287 feet. Production is reported 40 gravity crude, free from sulphur. Prairie's No. 4 has been spotted on the same farm a little northwest of No. 3.

In Lambton County, British Petroleum Co.'s No. 1, Alex McKinley farm, Concession 8, Plympton Township, is below 825 feet. Some oil was struck in the shallow horizon accompanied by water. In Brooke Township, Lambton County, Scientific Oil & Gas Syndicate of Toronto has finished No. 1 as a shallow oil pumper with a fair production of 39 gravity crude.

In Wentworth County, Rockton Oil & Gas Co.'s No. 1, Mrs. William Burgess farm, Beverly Township, finished dry in the top of the granite at 2,455 feet. Three other tests will be drilled, as the log indicated good possibilities higher on the structure. Officers of the company are: President, Chester Newton, Dundas; vice president, George Weatherston.

Vacuum Gas & Oil Co. of Toronto has leased acreage in Middlesex County adjacent to the Mosa Field and will start drilling this spring. Crude is looked for in the Corniferous limestone around 375 feet.

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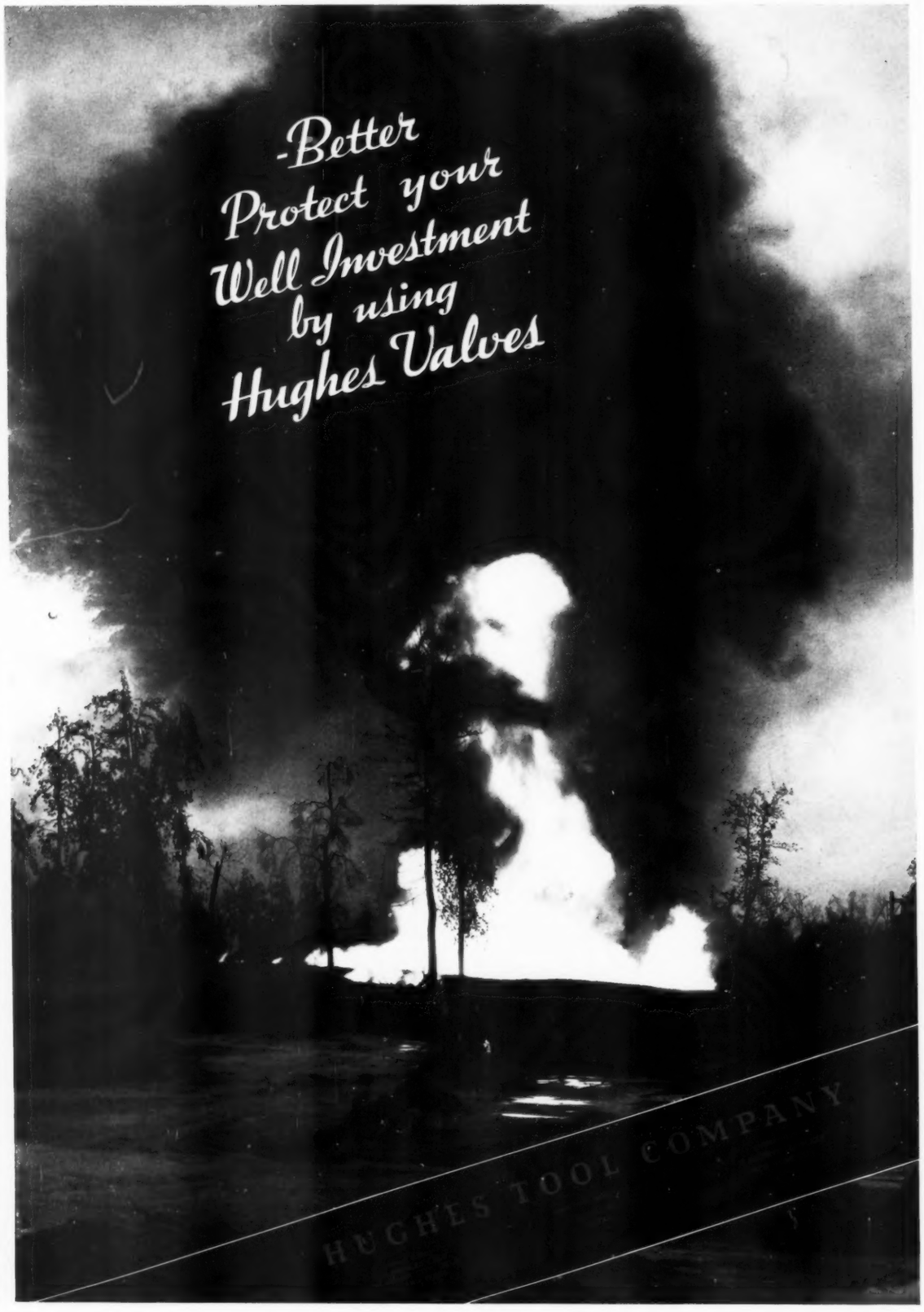
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